DOCUMENT RESUME

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ABSTRACT

ParenTech is a technology information initiative designed to educate families about the impact technology has on the ways children learn, work, and live. Designed for parents of middle school students (grades 6-8), the ParenTech Resource Kit contains the following materials: (1) a poster that outlines suggested activities for promoting the value of technology; (2) "Does It Compute?," a parent guide on technology and education, (3) "When I Grow Up," a parent guide on technology and careers; (4) "Fast Forward to the Future," a parent guide on technology and society; (5) "The Librarian's Guide to Cyberspace for Parents & Kids" (American Library Association), including recommended World Wide Web sites and Internet safety tips; (6) an interactive CD-ROM entitled "Parenting in a Digital Age"; (7) a "Technology + Society" brief that highlights technology trends and predictions; (8) a brochure and letter describing this resource kit; (9) sample materials from a Teacher Guide; and (10) a "Principal's Tip Sheet." (MES)

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ED 433 800

ParenTech

Parenting in a Digital Age

A Partnership of Ameritech and NCREL

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ParenTech is a unique technology information initiative designed to educate families about how technology makes a difference in the ways we learn, work, and live. Made possible by a partnership of the North Central Regional Educational Laboratory (NCREL) and Ameritech, ParenTech provides families and educators of middle school children (grades 6-8) with free resources focused on technology's role in education, careers, and society.

ParenTech brings together the latest research from experts, inspiring stories from families and educators, practical tips, and places to go to learn more—all in a parent-friendly resource kit that includes:

- Three 16-page Parent Guides
- An interactive CD-ROM
- A Web site, available at **www.parentech.org**

ParenTech also reaches out to middle schools with an informative Teacher Guide, a principal's tip sheet, and a colorful poster. In addition, ParenTech connects with communities through a "mini-exhibit" scheduled to visit regional museums during the summer and fall of 1999.

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North Central Regional Educational Laboratory (NCREL) is a nonprofit educational research and development organization supported in part by the U.S. Department of Education. Our mission is to strengthen and support schools and communities so that all students achieve standards of educational excellence. Simply put, we are here to help teachers teach better; students learn better; administrators provide better leadership; policymakers make better policy; and families, communities, and schools collaborate more effectively on behalf of all students.
www.ncrel.org

Ameritech, the Midwest's leading telecommunications company, provides a wide range of communications products and services to millions of customers in 50 states and 40 countries. We understand how important technology is, particularly in the lives of families, and we understand how vital it is to develop these skills in our children. That's why we're proud to join with NCREL to develop the ParenTech program and to make ParenTech part of our strong tradition of supporting and giving back to the communities we serve. In 1998, Ameritech contributed more than $27.2 million to help more than 3,800 nonprofit organizations achieve their goals. And nearly 43,000 of our employees and retirees volunteered 482,000 hours to support health and human services, civic and community projects, and educational and arts programs.
www.ameritech.com

ParenTech
Parenting in a Digital Age

A Partnership of Ameritech and NCREL

North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60523-1480

Ameritech

NCREL
North Central Regional Educational Laboratory
"Applying Research and Technology to Learning"

ParenTech
Parenting in a Digital Age

A Partnership of Ameritech and NCREL

North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60523-1480

800-356-2735
Fax 630-571-4716

For orders: 1-877-298-7273

www.parentech.org

September 29, 1999

Dear Public Affairs/Public Relations Director
Education Resource Information Center (ERIC)
1100 West St., 2nd Floor
Laurel, MD 20707-3598

Dear Dear Public Affairs/Public Relations Director:

On behalf of the North Central Regional Educational Laboratory (NCREL) and Ameritech, I am pleased to inform you that your organization/publication was mentioned in the Technology and Education Parent Guide which is part of the ParenTech Resource Kit. In case you haven't heard, ParenTech is a new campaign helping families of middle school students (grades 6-8) "get a grip" on technology. Your complimentary ParenTech kit is enclosed.

ParenTech provides families with free resource kits that help to educate them about the impact technology has on the ways their children learn, work, and live. Developed by NCREL and funded through a major grant from the Ameritech Foundation, ParenTech brings together the latest research, inspiring stories, practical tips, and places to go to learn more.

Initially a pilot project in the Midwest, ParenTech is now available to parents of middle schoolers nationwide. Parents can order their free kit by calling ParenTech's toll-free number at 1-877-298-7273; by visiting the Web site at www.parentech.org; or by writing to ParenTech at P.O. Box 263, Franklin Park, IL 60131.

You can lend your support to family education about technology by helping to spread the word about ParenTech through your own networks. Please feel free to use the attached sheet of sample copy for newsletters, Web sites, or other means of publicizing the project, as you see fit.

Also, we're looking for additional partners to help disseminate kits to Midwest families. If you know of middle schools/districts that have identified parent involvement in technology as a goal for the upcoming school year, please let them know about ParenTech's free resources. There are many ways educators and community groups can use ParenTech as a tool in these efforts. Also, there may be codevelopment or evaluation opportunities with NCREL.

If you have questions, comments, or ideas, please feel free to contact me at 630-368-3793 or afreel@ncrel.org.

Best regards,

Annie Freel

Annie Freel
ParenTech project manager
NCREL

Building a Partnership

ParenTech is a unique partnership of the North Central Regional Educational Laboratory (NCREL) and the Ameritech Foundation. Together, NCREL and Ameritech are making an important investment in how families understand and use technology to enhance how their children will learn, work, and live.

NCREL is a nonprofit educational research and development organization supported in part by the U.S. Department of Education. Our mission is to strengthen and support schools and communities so that all students achieve standards of educational excellence. Simply put, we are here to help teachers teach better; students learn better; administrators provide better leadership; policymakers make better policy; and families, communities, and schools collaborate better on behalf of all students.
www.ncrel.org

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www.ameritech.com

How to "Get a Grip" on ParenTech

Parents...Order your free ParenTech Kit today! (Note: Quantities are limited.)

Educators...Look for the free ParenTech Kit (including your Teacher Guide) coming to your school in the fall of 1999!

Librarians...Look for your ParenTech Kit in the fall of 1999 (made possible through a partnership with the American Library Association)!

Call Toll-Free: **1-877-298-7273**
(1-877-298-ParenTech)

Write us at:
ParenTech
P.O. Box 263
Franklin Park, IL 60131
Fax us at: (847) 678-7054

E-mail us at:
parentec@ncrel.org

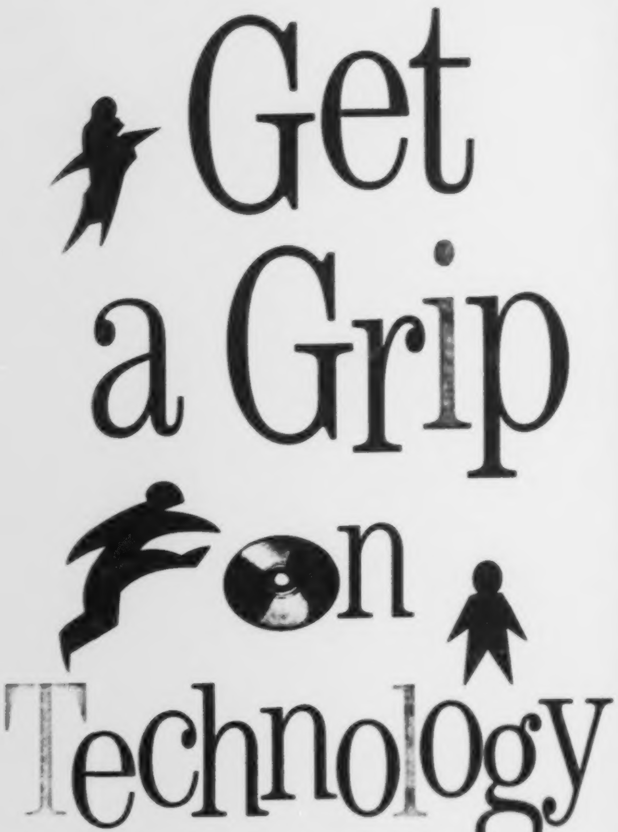
Or visit us online at **www.parentech.org**

ParenTech resources can also be found at middle schools and public libraries in Illinois, Indiana, Michigan, Ohio, and Wisconsin beginning in summer/fall 1999.

> *"In a time of drastic change,*
> *it is the learners who inherit the future."*
> – Eric Hoffer

Ameritech NCREL

Help Parents...



Get a Grip on Technology

ParenTech
Parenting in a Digital Age

A Partnership of Ameritech and NCREL

What Is ParenTech?

"The future ain't what it used to be."
– Yogi Berra

For the first time in history, being a parent means understanding how technology makes a difference in young peoples' lives. Yet all too often, parents don't feel they know how to guide their children through this digital age.

Kids today seem so at ease with technology ... but many families still wonder if their children are using technology in productive, educational ways.

"What technology skills should my child learn in middle school?"

"How can I help my child explore tomorrow's high-tech careers?"

"Where can I learn about the technologies that will shape my child's life in the next century?"

The answers to these and many other questions can be found with the help of **ParenTech**, a unique technology information initiative that's educating families across the Midwest.

ParenTech provides families and educators of children in grades 6-8 with the latest research, inspiring stories, practical tips, and places to go to learn more—all in a free, parent-friendly kit of resources focused on three important topics:

The way we learn...
Technology and Education

The way we work...
Technology and Careers

The way we live...
Technology and Society

The ParenTech Kit Includes:

- ✔ Three 16-page Parent Guides
- ✔ An interactive CD-ROM
- ✔ A Web site, available at www.parentech.org

ParenTech also reaches out to middle schools with an informative Teacher Guide, a principal's tip sheet, and a colorful poster. In addition, ParenTech connects with communities through a "mini-exhibit" scheduled to visit regional museums during the summer and fall of 1999.

Resource kits are free to families, schools, and libraries in Illinois, Indiana, Michigan, Ohio, and Wisconsin.

Parents and educators outside these states can access online resources at ‹www.parentech.org›.

With ParenTech Resource Kits in hand, families and educators will be ready to "get a grip" on technology and explore the future with their children—both at home and at school.

"Once a new technology rolls over you, if you're not part of the steamroller, you're part of the road."
– Stewart Brand

What You'll Find...

Technology and Society Guide

Technology trends and cutting-edge innovations

Parent-friendly definitions of common technology terms

The lifelong learning skills critical for the next 20 years

Technology and Careers Guide

How technology is changing the 21st-century workplace

Conversations with high-tech professionals

How families and schools can enhance middle schoolers' career development

Technology and Education Guide

Key elements of a high-quality middle school education

How technology can support middle school teaching and learning

Educational technology benchmarks

CD-ROM

"Virtual Q & A sessions" with experts in education, parenting, and technology

Fun activities to help parents guide their children through a digital age

Video visits to middle school classrooms where technology is bringing learning to life

Web Site (www.parentech.org)

Interactive forums where families and educators can share ideas, questions, and concerns

Links to dozens of interesting and educational sites

Informative interviews with families, educators, and others

... plus much more!

ParenTech
Parenting in a Digital Age

Tec nol gy

+ SOCIETY

with the new millennium just around the corner, it's only natural to wonder what the next century will have in store for our kids. Every day, people predict the weather, the stock market, and sports games—but what about the future of technology? Take time this summer to explore some of the latest technology trends and predictions with your family. **Begin your journey by posting this Parent Brief on your refrigerator door!**

FU URE ACT

Who thinks this stuff up?

Electronic Wallets—Talk about a paperless society...soon you may be able to keep credit card numbers, medical information, other vital statistics, and even the latest best seller on a digital "smart card" that will fit in your pocket. (Coming in 2005)

Cyberfashion—Computers in your clothes? Yes, it's true. Imagine wearing eyeglasses with a PC screen on the lens or a fabric keyboard sewn into your jacket. (Coming in 2009)

Smart Highways—Computerized maps (Global Positioning Systems) in some of today's cars help you get from point A to point B. Tomorrow's highways may do the driving for you with computer networks that "tell" your self-driving car where to go and how to avoid traffic jams. (Coming in 2019)

"Nanocomputers" no bigger than a molecule may someday cure diseases by traveling through your blood stream to detect and fix faulty genes. (Coming in 2029)

Summer Fun!

Plan a virtual vacation. Plan your family vacation online! Explore exciting destinations, map out a route, and make reservations. Whether your family logs on at home, the library, or a community center, adventure on the Internet is a click away. Begin your journey at MapQuest www.mapquest.com or State Parks Online www.mind-spring.com/~wxrnot/parks.html.

Make "cyber safety" a priority. Before your family goes online, set ground rules for computer use, including time limits and use of passwords. Discuss privacy, online etiquette, and which types of Web sites to visit or avoid. To learn more, visit the Children's Partnership www.childrenspartnership.org or the American Library Association www.ala.org.

Explore these cool Web sites...

www.astc.org Looking for a high-tech museum close to your home? Search no further. Visit the Association of Science-Technology Centers' Web site and click on "Travel Guide" for a listing of over 400 museums.

www.mars2030.net The Mars Millenium Project invites kids in grades K-12 to research and design their own 100-person Mars space station for the year 2030.

www.wfs.org Be a futurist! Learn about the latest forecasts, trends, and ideas by visiting the World Future Society's Web site. Discover how new technologies are shaping the future.

rick.dgbt.doc.ca/~jean/english/lrn home.htm Lifelong learning is the key to success in tomorrow's high-tech world. This online course includes quick quizzes and activities to help you pinpoint your learning style.

www.growingupdigital.com What is the "Net Generation" really like? Based on *Growing Up Digital*, by Don Tapscott, this site looks at how technology affects our kids.

Curious? Want to know more?
Call 1-877-298-ParenTech to order your FREE ParenTech Resource Kit
Or visit our Web site at www.parentech.org

Parenting in a Digital Age

A Partnership of Ameritech and NCREL

To order: 1•877•298•ParenTech
Fax: 847-678-7054
www.parentech.org

ParenTech is a unique technology information initiative that educates families of middle school children (grades 6-8) about the ways technology is changing how we learn, work, and live. **ParenTech's FREE Resource Kit** brings together the latest research, inspiring stories, practical tips, and places to go to learn more. It includes:

- Three 16-page Parent Guides
- An interactive CD-ROM
- A Web Site www.parentech.org

ParenTech also reaches out to middle schools with informative Teacher Guides and connects with communities through a "mini-exhibit" scheduled to visit museums throughout the region during the summer and fall of 1999.

"The future
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Yogi Berra

North Central Regional
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A Public/Private Partnership

ParenTech is a unique partnership of Ameritech and the nonprofit North Central Regional Educational Laboratory (NCREL). In 1998, the Ameritech Foundation awarded NCREL a grant to create ParenTech. With each partner bringing its expertise to the project, this public/private collaboration represents a unique investment in families, education, and the future.

NCREL
North Central Regional Educational Laboratory
"Applying Research and Technology to Learning"

Ameritech®

The Librarian's Guide To
Cyber Space
for Parents & Kids

From the American Library Association

Introduction

The Internet, World Wide Web, information superhighway and cyberspace are all words used to describe this exciting and fun learning tool.

At the touch of a keyboard, you can read the *London Times* or watch a volcano come to life on a computer screen. You can read a story to your child, "visit" Hawaii or view an original copy of Lincoln's Gettysburg Address. You can also send "mail" to a friend in another town — or country.

The sheer volume of places to go and things to do online can be overwhelming. It can also make it difficult to find the exact information that you want. In fact, some people have compared cyberspace to a library with all the books dumped on the floor.

Librarians are experts at selecting, organizing and categorizing information so it is easy to find and use. Today, we are applying those same skills to cyberspace so that you and your child can take best advantage of the vast resources the Internet offers.

Like radio, movies and TV before it, the Internet has raised concern about its possible negative impact on children. Teaching your child how to use this technology and to make wise choices is one of the most important things a parent can do.

Remember, it's not the technology, but how it is used, that makes a difference.

We hope this brochure will help you and your child enjoy the benefits and pleasures of being Web savvy.

It's important for parents to educate themselves about this new technology and the opportunities it provides for fun and learning.

Spending time online with your child is the best way both to learn about the Internet and to teach responsibility, good conduct and values that are important to you. Ask children to share their favorite Web sites and what they like about them. Help them discover Web sites that can help them with their homework, hobbies and other special interests.

It's also important to teach children "netiquette" — how to behave online. Such straightforward rules as not typing in all capital letters (it looks like you are shouting), being polite, and keeping quiet in chat rooms until you get a sense of what people are talking about, are simply good manners as well as common sense.

If you don't have a computer or Internet connection at home, many libraries, colleges and cybercafes offer equipment for public use. Many provide Web pages with recommended sites and offer classes for children and adults. Some schools and community centers offer special programs for parents to learn about the Internet and what it offers children.

We encourage you to take advantage of these opportunities.

Definitions

Just as there are different TV channels and kinds of magazines, there are many types of places to visit in cyberspace.

Here are a few examples:

- ***World Wide Web*** sites often contain colorful graphics, sound and animation, as well as text, and each may be linked to many other Web sites. Many of the most informative sites are sponsored by educational and nonprofit organizations. Some sites are sponsored by movie companies, toy manufacturers, publishers and other firms to sell their products. There are also thousands of sites created by individuals to express an idea, pursue a hobby or "publish" their own vision.
- ***Usenet groups*** are postings on specific topics, where the comments, and sometimes images, follow one another in a bulletin board style.
- ***Chat rooms*** are generally devoted to particular subjects like baseball or video games. Participants can talk to each other in "real time" with their remarks appearing as they type them in.
- ***E-mail*** makes it possible to send a written message to one person or to thousands, almost instantaneously.

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Safety Tips

The best way to ensure your child's safety on the Internet is to be there. Of course, that is not always possible. Just as you teach your child rules about dealing with strangers outside the home, you must provide rules for communicating online.

Suggested rules for kids:

1. Always ask your parents' permission before using your full name, address, telephone number or school name anywhere on the Internet.
2. Always tell your parents or other adults you trust if you see something online that is scary or that you don't understand.
3. Don't respond to messages that make you feel uncomfortable or uneasy.
4. Never give out a credit card number or password online.
5. Never arrange to meet in person someone you've met online unless you discuss it with your parents and an adult goes with you.

Teach children that not everything they see or hear may be true. Some sites may be trying to sell them something or contain inaccurate information.

Remember, the vast majority of Internet sites are perfectly safe. But, like the real world, the virtual world contains some sites with sexual, violent and other content that may not be appropriate for children.

If you have a home computer, a number of software filters are available to block Web sites you may not want your child to visit. Parents need to understand that filters are not perfect. They cannot block everything you might not want your child to see and they may block information that is helpful. Even if filters were 100 percent effective, this software is no substitute for parental guidance.

We strongly recommend that you supervise older as well as younger children's Internet use at home and at the library. It's a good idea to place computers in the kitchen, family or living room so that you can see your child using it. Young children should never be allowed to "surf the Net" alone.

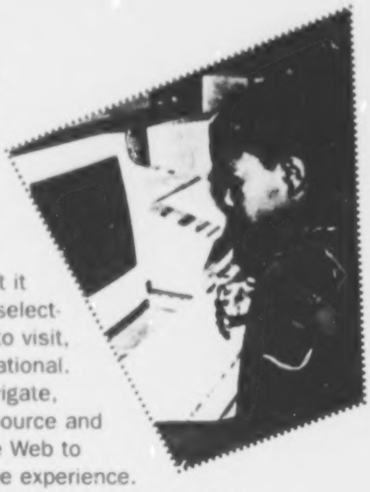
Selection

What Makes a Great Web site?

Here are some guidelines suggested by the Children and Technology Committee of the Association for Library Service to Children, a division of the American Library Association.

- The purpose and content of the Web site are clear. A source is clearly identified. Contact information is provided.
- The content encourages exploration and thinking. It is appealing to, and suits the age level of, the children for whom it is designed.
- The site is easy to access. It loads quickly, and essential information comes on the screen first. The information is accurate and updated regularly.
- The site takes advantage of the possibilities of the Web — it does more than can be done with print. It contributes something unique or unusual.

Parents should also examine Web sites for racial, gender and other biases they feel are inappropriate for their children.



This brochure includes a list of "50+ Great Sites for Parents and Kids" compiled by librarians who work with children and are familiar with the Internet and what it offers. These sites were selected because they are fun to visit, entertaining and/or educational. They are also easy to navigate, have a clearly identified source and make effective use of the Web to create a unique interactive experience. These "Great Sites" can be found on the American Library Association Web site at http://www.ala.org/parentspage/greatsites/guide.html.

We encourage you to contact your librarian with questions and for additional Web sites that he or she might recommend. Borrow materials from your library. Attend classes. Visit the American Library Association's "Great Sites" Web site with your child.

Q & A For Kids

Children can get help with homework questions and guidance in using Web resources via KidsConnect, an online question and answer service sponsored by the American Association of School Librarians, a division of the American Library Association, with support from Microsoft. Send questions by e-mail to AskKC@ala.org. Allow two school days for answers. For more information, see http://www.ala.org/ICONN/AskKC.html.

Printing of this edition of *The Librarian's Guide to Cyberspace* is underwritten by the Ameritech Foundation.

For additional copies contact:
American Library Association
Public Information Office
50 E. Huron St., Chicago, IL 60611
Phone: 800-545-2433 ext. 5041/5044
Fax: 312-944-8520 Email: pio@ala.org

Principal's Tip Sheet

Dear middle school principals and other educators:

This tip sheet provides you with tools you can use to involve your school's families in learning with and about technology through ParenTech. We hope you find these materials helpful; check the "Resources for Educators" and "Idea Box" pages on ParenTech's Web site (www.parentech.org) for more tips and tools to come!

* * *

About ParenTech

For the first time in history, parenting well includes understanding how technology impacts children's lives. Every day, computers transform the ways we learn, work, and live.

"The future ain't what it used to be."—Yogi Berra

Middle school is a particularly exciting time in young people's lives. During these years (10-15), kids are learning about themselves, developing important skills, and starting to think more seriously about their futures—futures where technology is an important reality.

Yet all too often, parents and educators don't feel they know how to guide today's children through this digital age.

Now, there's someplace they can turn for answers. **ParenTech** is a unique technology initiative that's educating families throughout the Midwest. ParenTech provides families and educators of children in grades 6-8 with free resource kits to bring them up to speed with "must-know" technology information focused on:

The way we learn...Technology and Education.

The way we work...Technology and Careers.

The way we live...Technology and Society.

Connecting families and schools is another ParenTech priority. The ParenTech kit and Teacher Guide can help your school strengthen bonds with parents by providing discussion tools and fun activities.

Your school's ParenTech Kit includes:

- Three 16-page Parent Guides v An interactive CD-ROM
- Teacher Guides for grades 6-8
- A Web Site, available at www.parentech.org

Finally, ParenTech connects with communities through a "mini-exhibit" scheduled to visit regional museums during the summer and fall of 1999.

ParenTech was made possible by a unique partnership of the not-for-profit North Central Regional Educational Laboratory (NCREL) and the Ameritech Foundation.

* * *

Building Blocks!

Build parent partnerships at your school by promoting the value of technology.

Host a ParenTech Night! Invite parents for a fun "crash course" in technology.

Get students involved-they can teach the grownups for a change! You might even create a technology folder for visitors that highlights your school's technology initiatives, tips, and other local tech resources.

Invite Guest Speakers! Invite business and community leaders to your school to talk with students and parents about technology. Have them discuss the educational route they chose, the skills they acquired, and the ups and downs of their jobs.

Use the ParenTech Teachers' Guide! Hear from experts and fellow educators. Learn how technology can be integrated into your existing curriculum through fun classroom activities. And discover great tips for getting parents involved.

Reach Out to Parents! Hang this poster in your school, and place your school's ParenTech Kit where parents and teachers can use it-in your school's library, media center, or parent room. Encourage parents without computers at home to go to their public library to take classes and learn more about computers and the Internet.

Host a ParenTech Discussion Group! Use pages from the ParenTech resources and Teachers' Guide as discussion tools to identify issues that are important to your school's technology and parent involvement initiatives. Share ideas from the Guides in parent newsletters and other "take-home" materials.

Visit the ParenTech Web site for more ideas!

* * *

Spread the Word...

Adapt the sample copy for your parent/community newsletter.

We all know how quickly kids catch on to new technologies-in some cases, more quickly than parents and teachers!

Here at [insert school name], we are working to make technology a tool that supports learning for all students. As a parent, you also have an important role to play in helping kids learn with technology…but sometimes that's "easier said than done."

Now, a free kit for parents, called ParenTech, is available to help families "get a grip" on technology. Made exclusively for parents of 6-8 graders, these resources will help you learn about parenting in a digital age.

The ParenTech Kit includes:
Three 16-page Parent Guides
An interactive CD-ROM
A Web site, available at www.parentech.org

ParenTech provides families and educators of children in grades 6-8 with free resource kits to bring them up to speed with "must-know" technology information focused on education, careers, and society.

You can order your free ParenTech Kit by either calling 1-877-298-7273; writing to ParenTech at P.O. Box 263, Franklin Park, IL 60131; or visiting the Web Site at www.parentech.org.

[Insert school's name] and our public library have also received free ParenTech Kits for families to use.

ParenTech was created by the non-profit North Central Regional Educational Laboratory (NCREL), and made possible by a grant from the Ameritech Foundation.

With ParenTech in hand, you can "get a grip" on technology and guide your child toward the 21st century!

* * *

Letter to the Editor

Edit the sample copy to reflect your school's technology initiatives. Retype on your school's letterhead and send to the editor of your local newspaper.

Dear Editor:

As the principal at [insert school's name], I find that many parents have questions and concerns about how technology is affecting their children's lives.

Middle school represents an important time in children's lives. Young people between 10 and 15 are learning about themselves, developing important skills, and starting to think more seriously about their futures-futures where technology is a reality in the ways they'll learn, work, and live.

At [insert school], we are always working to keep our students' families informed about important technology issues that affect learning.[Insert information about your local technology and parent involvement initiatives.]

In keeping with this tradition, I'd like to tell [insert community name]'s middle school families about a new technology education initiative for parents called ParenTech.

ParenTech provides families and educators of children in grades 6-8 with free resource kits to bring them up to speed with "must-know" information focused on technology in education, careers, and society. Kits include three print parent guides, a CD-ROM, and an associated Web site located at www.parentech.org.

You can order your free ParenTech Kit by either calling 1-877-298-7273; writing to ParenTech at P.O. Box 263, Franklin Park, IL 60131; or visiting the Web site. Resource kits are also available for use at public libraries throughout the Midwest.

ParenTech was created by the non-profit North Central Regional Educational Laboratory (NCREL) and made possible by a grant from the Ameritech Foundation.

I hope our community's middle school families will take advantage of this opportunity.

Optional: [insert school name] is hosting a Tech Open House on [insert date]. [insert key activities]. On behalf of our school, I'd like to invite parents and interested community members to join us. Please contact [insert name and phone number] for more information.

Sincerely,

[your name here]

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ParenTech Home

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Teacher Guide

This page provides some samples materials from the Teacher Guide. (The complete Teacher Guide will be available at a later date.)

On this page, you'll find:

- Articles about Technology and Education, Technology and Careers, and Technology and Society
- The success story of a teacher who has integrated technology into the curriculum
- A lesson activity called Passport to the World. This activity provides opportunities for students to use technology resources and for parents to be involved in their children's education.

Technology and Education

Learning for Earning

Interestingly, the "employability skills" identified by top employers parallel those skills developed by the learning activities that accommodate the middle schooler's need to explore, to be a self-directed learner, to solve problems, and to collaborate with peers.

All employers want workers who can read, write, and think intelligently. They also want employees who can work in groups, solve problems, and use computers to accomplish their tasks.

Accommodating Learning Styles

As you know, in early adolescence, children are driven by the need to live and learn more independently. Consequently, for some students, the traditional classroom provides a frustrating, rather than a motivating, experience.

> **If motivating students to learn is identified as a desirable outcome of teaching, then technology can be considered to be an effective teaching tool. Studies indicate that students feel more motivated to work in class when they're using a computer.**

Fortunately, the integration of technology with curriculum introduces a new degree of freedom to the learning process, enabling teachers, such as you, to structure lessons in a manner that permits independence and facilitates learning in a manner compatible with the learning styles of middle school-aged children.

You already know that your students learn best when they are actively involved in constructing knowledge as opposed to simply memorizing facts and figures. So, we can conclude that high-quality learning occurs when children are fully ***engaged*** with the material being introduced-when students can see the relevance of the concepts.

What Is Engaged Learning?

Engaged learning involves making sense of new experiences in relation to concepts already understood. This kind of learning can be facilitated when children are working on authentic (real-world) tasks that are multidisciplinary (draw upon a variety of content areas).

To facilitate engaged learning, activities must capitalize upon the middle schooler's curiosity and hunger for novelty and discovery. There's lots of evidence suggesting that activities that incorporate the use of classroom tools -including computers-to support engaged learning

enhances critical thinking skills, contributes to improved performance on authentic tests of subject knowledge and skills, and motivates students to learn.

Tools To Facilitate Engaged Learning

Fortunately, using state-of-the-art equipment is not essential to the planning and facilitation of high-quality learning experiences. Computers with good memory, modems with adequate speed connections to the internet, and software that promotes engaged learning are the foundations for providing your students with quality learning experiences and transferable skills.

Obviously, the technology resources available for teaching and learning tools vary from classroom to classroom. There is not one combination of technologies that guarantees engaged learning will occur. Ideally, you will be able to expose your students to a wide variety of technological applications such as those described below:

The World Wide Web/The Internet is used primarily for researching topics by conducting Web searches and visiting Web sites. Several exciting sites have been created specifically with K-12 educators in mind.

The New York Times Learning Network features an article from the *Times* every day, complete with related classroom activities. http://www.nytimes.com/learning/

> **"The Internet gives students and teachers easy access to current and relevant kinds of data that they can't get any other way. Use of the Internet enriches students and encourages creativity."**
> - Sue Swaim
> Executive Director, National Middle School Association

Charged with preserving the United States' history and supervision of all federal records, the National Archives & Records Administration's (NARA) Web site highlights some of the documents in its collection and provides lesson plans and teaching suggestions. http://www.nara/gov

Providing a clear explanation of the universe that is easily followed by students, the Astronomy for Kids Web site covers topics that include constellations, planets, black holes, and comets. A telescope allows site visitors to select a planet or constellation for a simulated view. http://tqjunior.advanced.org/3645/

Lesson plans on musical topics introduce students to music composition, rhythmic patterns, and musical instruments at the AskERIC Lesson Plans, Arts: Music Web site: www.ericir.syr.edu/Virtual/Lessons/Arts/Music

Web Teacher is a free, interactive, self-paced Internet tutorial available 24 hours a day, 7 days a week. This site, designed by teachers for teachers, allows you to learn about the World Wide Web, e-mail, videoconferencing, chat rooms, Web page design, Internet safety, and online curriculum design. This resource accommodates all levels of expertise, from the novice to the veteran Internet user. http://www.webteacher.org

Suggested Student Technology Competencies

Students in grades 6-8 should be able to:

- **Demonstrate knowledge of current information technologies.**
- **Use content-specific tools to support learning and research.**
- **Apply tools to support personal productivity, group collaboration and learning throughout the curriculum.**
- **Design, develop, publish, and present products using technology resources.**
- **Collaborate with peers and experts using technological tools to investigate problems or issues and to develop solutions or products.**
- **Research and evaluate the relevance, appropriateness, completeness, and bias of electronic information.**
- **Adapted from the National Educational Technology Standards developed by International Society for Technology in Education**

Word processing programs allow students to store text that they write and provide a means by which students may develop editing skills. Used thoughtfully, these programs contribute to improved skills in spelling and grammar and enhanced vocabularies with the aid of spell checking, thesauruses, and other online tools.

Presentation Programs enable students to create multimedia presentations and can help students learn to organize information and communicate effectively.

E-mail Programs allow users to send and receive text messages. Students may use e-mail to communicate with students in other classrooms or other schools or with experts they might not otherwise be able to contact.

Facilitated by Australian educator Dean Parton, the My Country, Your Country project gives students a meaningful understanding of other cultures by using the Internet as a communications link among classrooms spread throughout the world. Students can sign up as representatives of their geographical region and act as online ambassadors. Participants use e-mail to ask each other questions about their cultures.
http://www.bshs.wa.edu.au/partner/proj/country/cover.htm

Every month, the Writers Online Web site hosts writing workshops run by leading authors. Students are encouraged to investigate the author's background, take a writing challenge, and then publish their work on site. The authors will provide feedback on each student's work. Registrations will be accepted through July 31, 1999.
http://www.yearofreading.org.uk/writers/index.html

Technology, used appropriately and inventively can transform your classroom.

But technology isn't a solution to every educational problem. It should be used in the classroom only in ways that accelerate and enhance student learning and enthusiasm.

Reaching Underperforming Students

Technology application appears to be a promising strategy for reaching underperforming or disenfranchised students.

Computers can reach kids who are frustrated or fearful of traditional teaching methods.

> **Technology can expand learning resources and learning opportunities, respond to differences among students, empower students and free teachers, promote the integration of knowledge across disciplines, and break down the traditional definitions of where, when, and how teaching and learning take place. The key word is can.**
>
> - Illinois State Board of Education, 1998.

More individual attention, greater interdisciplinary work; the ability to work independently at one's own pace without being excluded from the classroom; the opportunity to work collaboratively with other students on technology-supported projects; and the relevance computers bring into the classroom have been shown to benefit underperforming students.

Facilitating Learning Among Students With Disabilities

Technology has also been effective in helping students with disabilities.

The Internet provides a wealth of information and resources for teachers, parents, and special students. Mainstreaming into community schools cannot be successfully achieved without reeducating teachers, parents, and other students about the unique abilities special students bring to the learning environment, given the opportunity, proper tools, and support.

Special Web Sites for Special Needs

Center for Exceptional Children
http://www.cec..sped.org

LD Online
http://www.ldonline.org

Special Needs Education Network
http://www.schoolnet.ca/sne/

Apple's Disability Site
http://www.apple.com/education/k12/disability/

Outside the Box
http://home.att.net/~shagberg/

The Can Do! Web Site
http://www.nlbbs.com/~mbush/

Inviting Parental Involvement

The importance of parental involvement with the education of their children is well documented. Research shows that when parents and other key adults are actively involved with the school and teacher, the child is much more likely to succeed.

> **"Helping a young person survive adolescence is like teaching a child to ride a bicycle. You have to hold on for a while, then let go and then you have to do a lot of running to keep up-to make sure they don't fall."**
>
> - Nicholas Gill, Psychologist

The parents of your middle school students have a special role in educating their children-one that complements your role of teacher. With your guidance, encouragement, and support, they can model and facilitate learning - including learning that is enhanced by technology.

Web Sites on Parental Involvement

Partnership for Family Involvement in Education
http://www.ed.gov/PFIE

National Coalition for Parent Involvement in Education
http://www.ncpie.org

U.S. Department of Education
http://www.ed.gov

U.S. Department of Justice - Justice for Kids and Youth
http://www.usdoj.gov/kidspage

C.S. Mott Foundation
http://www.mott.org

What Teachers Can Do to Facilitate Parental Involvement

- **Establish a vehicle for communicating with the parents of your students, which regularly informs them about their child's projects, homework, and progress. Consider the potential of technologies such as voice mail, e-mail, and Web pages to keep you connected.**
- **Inform parents how they can best support your role in the educative process-both at home and in your classroom. Provide them with guidelines for conducting research using the Internet and/or a list of interesting Web sites to explore with their children.**
- **Invite parents with specialized knowledge and technological expertise to give a demonstration to the class and/or to talk about how technology is integral to their career.**
- **Alert parents to your efforts to raise funds and/or purchase equipment. They may be willing to assist with fund raising and/or be able to facilitate a more economical purchase.**

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Technology and Careers

The students you are preparing today will be the technology specialists of tomorrow-the inventors of the 21st century.

The technological innovations being made today are so significant and so world changing that our students may earn their livelihoods pursuing careers that don't even exist yet! In any field-including sports, science, music, entertainment and art-some of the most fascinating and most lucrative jobs are in "high-tech" fields.

What are the high-tech careers?

High-tech careers are the careers that are held by the technical specialists in a particular field. These are the people who deal most intensely and exclusively with advanced digital technologies. They can be found in almost any career field, from business to medicine, to agriculture, to zoology.
http://www.pbs.org/jobs/

These are the folks who are making the new technological discoveries that make the headlines every day. Their discoveries create new career opportunities and entire new technological industries. Web pages, cell phones, are just a few recent innovations that come readily to mind.

Who are some of these professionals who design these new technologies and what skills define their jobs?

Wanted

Computer Scientist-a researcher who will push the limits of what computers do! Think George Lucas as he creates the latest *Star Wars* opus. Your task: Create new discoveries that will one day have practical application. You will work with computer engineers and others who specialize in designing new machines and systems.

Computer Engineers-creative individuals who will design and test new computer hardware and software that will run the networks of the future.

Computer Scientist: **Work as a theorist, researcher, and inventor in a research lab or an academic institution.**
Skills Needed: **Be able to think logically, be familiar with programming language and have a broad knowledge and experience with computer systems and technologies. Need strong problem-solving and analysis skills as well as good interpersonal skills.**
Education Required: **Generally need a Ph.D. or at least a master's degree in computer science or engineering.**

As we know, computer technologies have virtually redefined many jobs and created many entirely new job markets. Although we can't predict what technologies will be in place when our students are ready to begin their careers, we can help them develop the learning skills that will allow them to adapt to the work world of the future.

What are those learning skills? Let's ask the employers.

Today, all employers tell us that they want people who can read, write, and think intelligently...and who can work in groups, solve problems, and use computers while doing it. All employers want people who have self-management skills and initiative.

High-tech employers want even more. They want people with "tech plus" skills. These skills include understanding the needs of the business and coming up with inventive and appropriate technology solutions that get the job done. How do we prepare such employees? What are the specific skills they will need for the future?

Skills for 2025

- Ability to think and reason
- Ability to create, innovate, and synthesize
- Ability to get along with people
- Ability to speak in public
- Ability to use computers and communications technology and a willingness to update as new techniques emerge
- Ability to work independently-an entrepreneurial attitude

Not all technological careers require a college degree, but all technical careers will require workers to participate in continuing education classes to stay up to date on the latest development in the field.

The good news is the skills required for these high-tech careers are the same ones we are developing within our students:

- Strong basic skills in reading, writing, math, and science
- The ability to solve problems using these basic skills
- The ability to use computers and other technologies to solve problems
- The ability to work well with other people in an economy that is increasingly global and that relies more and more on collaboration

Achieving success in a high-tech workplace also will require students to:

- Manage resources of time, money, materials, facilities, and people effectively.
- Work with people amicably and productively to learn, serve, teach, and lead.
- Acquire and use information effectively.
- Master, understand, and improve complex systems.
- Work comfortably and expertly with a variety of technologies.

Action Plan

Early adolescents need activities that have relevance beyond the school walls-activities that take advantage of their natural curiosity and hunger for novelty, discovery, and challenge. This makes middle school years an ideal time for the career development process to begin.

> **Middle school is a time to become knowledgeable in a broad sense, about many career options. It's time to discover, question, and experience a wide variety of different possibilities.**
> - Sue Swaim, executive director of NMSA

Some may think it's too early to be talking about our students' future careers, but as we know, our students are making important choices now that can easily affect career paths that may or may not be open to them. For that reason, there are important steps we can take that will help our students explore the world of work. Certainly, our intent is NOT to "steer" our students into specific careers, but rather to help them make connections between decisions and experiences that they have today to support their dreams of tomorrow.

Where to Start?

> **During middle school, students should**
>
> - **Assess their talents.**
> - **Participate in career exploration activities.**
> - **Build a connection between academic skills and the future.**
> - **Set goals.**
> - **Start to formulate a career.**

What does an appropriate career development program look like? It is one that helps them:

- Build a positive self-image.
- Become more aware of their strengths and interests.
- Learn about what people in careers they like *actually* do
- Plan for high school and beyond.

http://www.collegeboard.org/planning/html/intro.html

http://www.collegeboard.org/pubaff/gronline/html/groframe.html

> ***Thinking about college*** **...50 to 66 percent of eighth graders planned on completing college but...only 25 percent planned on taking any college preparatory courses. Only 26 percent were learning about different occupations or the relationship between schooling and career options and only 49 percent of eighth graders were learning about the vocational courses offered in their high school.**
> - U.S. Department of Education

Activity Corner for Career Exploration

- Have students consider their own skills and interests. What's important to them? What are their gifts? What are they good at? And what would they really like to be good at?
- Research some occupations that interest them.
- How? Check out books; search the Internet for career bulletin boards and sites. Search the Web for companies in fields that interest them. Take a field trip. Look into community service projects and job

- Help each student make a plan by developing specific steps they must take to accomplish their goals. Have them talk with parents, guidance counselors, family friends, and other teachers.

http://adventuresineducation.org/planning/pc_goal.htm

Help students explore the following questions:

- What do people do in a particular job?
- Does the work look interesting? Fun? Fulfilling? Meaningful?
- Does it pay well?
- What knowledge and skills are required to do this work?
- How does a person acquire these skills?

http://jobsmart.org/tools/salary/index.htm

http://www.pbs.org/jobs/

http://www.Mapping-Your-Future.org/tours/k12stndt.htm

Top 10 things 6th Graders Want to Be When They Grow Up

1. **Professional sports player**
2. **Medical professional**
3. **Teacher**
4. **Entertainer**
5. **Veterinarian**
6. **Scientist**
7. **Lawyer**
8. **Law enforcer**
9. **Computer field worker**
10. **Writer**

- from Information Technologies of America Association

Parents as Partners

It is important to enlist parents and other influential adults to help our middle schoolers plan ahead. As parents, they have a unique opportunity to help their children explore possible careers and identify skills that will be needed in the workplace. An important prerequisite to this exploration is helping our students develop a **strong sense of self-esteem**.

Self-esteem and motivation to succeed are strongly linked. Helping our students feel good about their abilities and possibilities will increase their drive for success in school and beyond.

Don't let our students give up on math and science! If students seem highly frustrated by math or science or say things such as "I'll just never be good at that!" work with them. Take time to help them understand the concepts. Insist that they get help. Shore up their confidence that these subjects are not only learnable but also relevant. Even artists and writers use math and science concepts as fodder for their creativity.

This is even more crucial for your female students. Research over the last decade concludes that early adolescent girls, in general, drastically lose interest in math and science at a time in their lives and at a time in society when continuing with these courses of study are vital to their future options.

http://www.serve.com/iwitts/

www.minorities-jb.com

Suggested Extension Activities Involving Parents

- Family genealogies, including career trees
- Interviews with family members about their work
- Family members as classroom career resource speakers
- Classroom job treasure chest (a collection of items that parents make at work)
- Job shadowing with a parent or other significant adult
- Parent conferences to review student academic skills and work habits

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Technology and Society

Forces of Change

While technology isn't the only force changing our lives, it is one of the most pervasive. If we define technology as any human-made device that people use to accomplish something they need or want to do, it is easy to appreciate the range in complexity of the technology that is available to us in our homes and in our classrooms.

It can be said that society is a process of interactions. As the amount and complexity of technology introduced into our society increases, our interactions with technology and with each other will also continue to change.

As a teacher, you assume a unique and significant role in the lives of your students. By instruction, through guided practice, and by example, you teach them how to manage their interactions with available learning tools and with each other.

> **"New developments in technology change the course of people's lives, their behaviors, and their attitudes to the world."**
>
> - Coates, Mchaffie, and Hines, *2025.*

Education Reconceptualized

Our society is characterized by rapid developments in technology, information, and communication.

> **If you are not currently using the World Wide Web, it is likely that it will become an integral part of your world in the next decade. Forecasters believe that by the year 2008, 80 percent of the people in developed countries will have access to some sort of "information superhighway."**

Because technologies are changing so fast, a "one-size-fits-all" body of technology knowledge does not exist. Education for the completion of well-defined tasks is no longer sufficient. It has become critical, more than at any previous time, for people of all ages, including our children, to prepare themselves to be lifelong learners.

> **Tip: Encourage students to use computers and other technology tools in the same ways that scientists and other professionals do - to help them work in groups, analyze and present data, and share their work over the Internet with people elsewhere.**
>
> *- Technology Counts '98*

The person who is prepared to engage in lifelong learning can be characterized as possessing a skill set that enables him or her to continually adapt to new situations and new technologies.

Skills For Lifelong Learning

Preparing our children to be lifelong learners will require the development of skills in ***information literacy.*** As a teacher, it is imperative that you encourage your students to use the variety of information resources available to them.

sources.

In addition to finding information, students must develop skills in ***information assessment, analysis, and intrepretation.*** They must become skilled in comprehending data presented in a variety of formats, including numerical, chart, and graph form. People who are information savvy are able to determine whether the information they have accessed is relevant, accurate, and complete.

No doubt you have already incorporated problem-solving activities into the lessons that you plan for your students. Lifelong learners must be able to ***make decisions based on sound reasoning, relevant data, and ethical principles***. Incorporating the use of technology into classroom information gathering and problem solving will prepare your students for the learning that will be required by the technological innovations of the future.

Lifelong learners are skilled in ***collaboration.*** Capitalizing on opportunities to have your students in engage in collaborative, technology-supported projects will serve to strengthen their abilities to ***work well with a variety of people having a wide range of opinions and perspectives.***

Communication skills will be redefined in the society of the future. In addition to presenting their thoughts in verbal and written form, our students must be prepared to create, produce, and present their ideas using a variety of appropriate technologies and media.

> **"To thrive in today's world and tomorrow's workplace, America's students must learn how to learn, learn how think, and have a solid understanding of how technology works and what it can do."**
>
> *- The CEO Forum, School Technology and Readiness Report,* February 1999

If we are to prepare our students to engage in learning for the duration of their lives, we must facilitate ***self-directedness***.

As we prepare our students to engage in lifelong learning, we must foster their ability to identify and prioritize their own learning needs and interests.

> **Lifelong learning can perhaps best be faciliated by "building an awareness of 'self as learner' in our children."**
>
> - Gene Roth, Professor, Northern Illinois University

Our students need to learn how to take initiative and assume responsibility for their own learning endeavors. Finally, they must be taught how to evaluate the extent to which their experiences have satisfied their personal learning goals.

Lifelong learners are individuals who have developed the ability to ***adapt to change***.

Ultimately, the extent to which our students are able to accept new challenges and to think

creatively about the opportunities presented to them as a result of change, and their ability to be persistent will them, determines their success as learners throughout their lifetime and their ability to contribute positively to a changing world.

Shaping Our World

The ways in which our children will contribute to and impose change upon our world are innumerable and diverse. Many of our children will shape the world by the contributions they make in their work environments.

Sixty percent of the jobs available at the beginning of the next century will require skills currently held by only 20 percent of the workforce.

Recognizing that careers of the future will be located within a highly

ortant to cons
employers in the 21st century.

Check It Out

- Through the Global Learning and Observations to Benefit the Environment, or GLOBE project, students from 70 countries work with scientists to understand the global environment. **www.sri.com/policy/teched/projects/p4.htm**
- "Losing Ground Bit by Bit: Low-Income Communities in the Information Age," gives an overview on the distribution of technology in the United States and what kinds of community, state, and federal efforts can help close the digital gap.

  www.benton.org/Library

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Teacher Success Story

Folding Computers and Other Technologies into the Curriculum

Effective technology integration frees both teachers and students. Teachers shed their traditional role as content experts who dispense knowledge and become learning consultants who help students engage in knowledge building. In this new world of learning, students take responsibility for their own learning, move from studying in isolation to working in teams to solve complex, real-world problems. This seismic shift in learning requires some time-wrenching shift in teaching. And no matter how effortless outstanding technology programs may appear, enormous effort underlies them.

The following profile documents both the "shift" in learning and the effort teachers put in place to help students succeed.

An Electronic Field Trip to Africa

When Donna Holinga decided to teach her sixth- grade social studies class about Africa, the last thought on her mind was what textbooks to use. She knew that idea would astound her students. "They really don't have a concept that many sixth-grade classrooms and social studies classes are 'Open your book, read chapter 2, and answer the questions,'" explains Holinga, "because that's not how they get information.

Holinga's students at Lincoln School in Springfield, Illinois, expect to be told what research they'll need to do and what technology resources will be important. Holinga's class participates in project LINCOL'N (Living in the New Computer Oriented Learning Environment), an initiative to integrate technology into the mandated, middle school curriculum.

Holinga's goal for this integrated, thematic unit, "Exploring Africa," is to help her students recognize the diversity of the continent in its people, landform, and natural resources. To this end, she creates collaborative learning teams assigned to explore one African nation. Their study will include the diversity found in the people, the geography, and the natural resources.

As the students explore their selected nation, they will use screened Web sites, and CD-ROMS as well as the traditional technologies, which include film strips and laser discs. According to Holinga, any form of technology that "provides me with information for the kids or the kids with information, we'll use it."

To manage the flow of the research, she uses a rotation chart that moves the collaborative teams among the seven computer stations. For example, on Day 1, team one might work with the CD-ROM "Mammals of Africa" to explore animals indigenous to the nation. Day 2 might find them at the previewed Web sites researching the language, population, and natural resources of their country. Day 3 might find the team using traditional reference books to create a map of the continent.

Each day a group recorder fills in a task sheet, listing the date, the station, the technology being used, and the work accomplished.

A real plus for Holinga's class is that her sister lives in Africa and has connected the class with the real experts on Africa-those who live there. By

So how are the students faring with Project LINCOL'N and its emphasis on technology? From all accounts, they're thriving. Students do well on state, standardized tests; and when students who are now in high school are interviewed, they indicate they're doing quite well academically.

More important, Holinga's use of technology in her class allows students to delve deeply into subjects. It provides a tool that helps develop higher-order thinking skills and problem solving, and links curriculum with realistic experiences beyond the classroom walls.

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Passport to the World: A Project Lesson Plan

* Adapted from Ed Oasis Teacher's Guild Library (www.edsoasis.org)

> **"Technology can be used for much more than simply teaching students what they don't know; it can help them understand themselves and where they fit in this complex society."**
>
> - Alan November, Author of "Involve Students in Community, " October 1991

Time Required: Variable, depending upon number of student groups and the depth and breadth to which the project is incorporated into the curriculum.

Grade Level: Grades 6-8

Subject/Content Area: Social studies. Math, language arts, science, music, and art curricula could also be modified to incorporate the project.

Project Goal: Students will develop a meaningful understanding of diversity through their exploration of other cultures. Students will appreciate the relevance of diversity through their comparison of the cultures studied and with their own culture. Students will demonstrate their learning through the creation of a Multicultural Fair.

Prerequisite Skills: Students should be familiar with accessing information on the Internet, comfortable with cooperative team learning, and skilled in the development and delivery of an informational presentation. If these skills have not been previously developed, the project will require additional time for the introduction of these concepts.

Learner Outcomes:

As a result of their participation in the Passport to the World project, students will:

- Demonstrate the ability to communicate effectively with individuals of different genders, cultures, and points of view, within and outside of their classroom.
- Demonstrate the ability to gather information using content-specific tools to support learning and research.
- Analyze data, considering multiple interpretations, to answer a social science question, comparing results to known theories, current models, or personal experience.
- Evaluate the relevance, appropriateness, completeness, and bias of electronic and other information collected.
- Design, develop, and present products of research using technology resources to create an appropriate display that may include charts, graphs, and maps to illustrate themes or concepts relative to people, places and environments.
- Develop an understanding of the interconnectedness of the world with an appreciation for the similarities and differences among people of different cultures.
- Exercise skills in written and oral communication to create, produce, and present the conclusions of their research.

Materials: Folders, paper, art supplies, poster board, Polaroid camera/film for passport pictures (or have students bring a picture from home), sample passports, access to the Internet, scanner, and multiple copies of *The Ultimate Flag Sticker Book*.

Assessment: Expectations for student outcomes and how these outcomes will be evaluated must be presented and understood before beginning the project. Rubrics the cultural universals (history, food, shelter, clothing, religion, government, customs, education, politics, art, economics, family, communication, and transportation) may be a criterion for assessment. In addition, students may keep a log of their project activities, making journal entries that comprise individual "progress reports." Journal entries will facilitate reflection upon and discussion of what is learned, problems encountered, and project organization. Some log entries may be "directed," where students respond to specific questions from the teacher; other entries are "nondirected."

Promoting Engaged Learning

Engaged Learning occurs when:

- **Students collaborate in teams.**
- **Students determine what information is needed and how it will be retrieved.**
- **Students assume responsibility for collection of data.**
- **Students engage in a task that models the "real-world" phenomenon of traveling.**
- **Students collectively engage in the construction of knowledge.**
- **Students produce a model that represents their understanding and that can be shared.**
- **The teacher serves as a facilitator and resource guide rather than the disseminator of information.**

Procedures:

STEP ONE: INTRODUCTION TO THE CONCEPT OF DIVERSITY AND TO THE PROJECT

It may be beneficial to invite parents or grandparents of students in the class who are first generation immigrants to come and speak to the class about ethnic diversity and the similarities and differences they found between their native culture and the culture in the United States.

You may wish to have students interview each other about traditions or customs in their homes. These traditions may or may not be associated with particular holidays. A large group discussion that highlights the similarities and differences between customs could lay the foundation for the introduction of the concept of diversity.

In preparation for the Multicultural Fair, and as a way of introducing the project, students may research the process of obtaining a passport.

- What information is required to obtain a passport?
- How much does a passport cost?
- How long does a passport remain valid?
- What countries, if any, do NOT require a passport for entry?

Students should be given the opportunity to examine authentic passports before creating their own passports using software packages, as available, for drawing and importing images to construct the inside of their passports. Photographs may be scanned into the computer for inclusion in the passport. Encourage students to decorate the outside of their passport.

STEP TWO: TEAM BUILDING AND TASK ASSIGNMENTS

Divide students into small groups of approximately four students each. Provide the class with a list of the countries that would be acceptable for their research project. Allow time for each small group to reach consensus regarding which country they will research. Once consensus has been reached, the group will "sign up for" a country on the approved list. This procedure will eliminate duplications in research efforts.

Provide each team with a project overview that outlines the cultural universals, explaining that information should be collected on the history of the country, food, shelter, clothing, religion, government, customs, education, politics, art, economics, family, communication, and transportation. Clarify how the cultural universals will be used as criteria for project evaluation. Suggest that the teams identify the different topics that must be researched, as well as the multitude of tasks that must be completed, dividing the responsibilities among themselves. Require each team to devise a work plan that must be turned in and approved.

STEP THREE: DATA COLLECTION AND SYNTHESIS

Using the resources available to your classroom-including the Internet, CD-ROMs, guest speakers, and books from your library-have each small group research its country with the purpose of generating an oral report and creating a display. Arrange for the students to exchange e-mail messages with a representative of the country they are researching.

Instruct students on the use of note cards for organization of their data. One (or more) cards may be used for information collected on each cultural universal. When group members come together to share the results of their individual research efforts, data on common cultural universals may be easily combined, using note cards.

Require students to keep a log of the information they collect and the sources used, reflecting upon how their data gathering techniques might be improved.

INTERESTING WEB SITES TO VISIT

- **http://www.kidlink.org/KIDPROJ/MCC/ is a database of unique ways kids are celebrating their country's holidays and festivals.**
- **www.odci.gov/cia/publications/factbook/index.html includes facts on geography, population, government, and economy for every country in the world.**
- **http://galaxy.einet.net/galaxy/Community/World-Communities.html is a collection of information on countries around the world as well as international documents, guides, and directories.**
- **http://dir.yahoo.com/Regional/Regions/ searches information on any country, state, or town that has a site on the Internet.**
- **http://www.lib.utexas.edu/Libs/PCL/Map_collection/Map_collection.html includes public domain maps created by the CIA. "Electronic Cartographic Reference Resources" provides links to information about time zones and distances.**
- **http://fotw.digibel.be/flags/mirror.html displays images and limited information on flags from countries all over the world.**
- **http://www.intellicast.com/weather/intl/ provides international weather information.**
- **http://www.oanda.com/converter/classic computes the exchange rate between any two currencies. (Note: when entering date, day should appear before the month).**
- **http://www.travlang.com/languages/ is a source of basic vocabulary for travelers. English is translated into more than ten languages.**

STEP FOUR: DATA SYNTHESIS AND CONSTRUCTION OF UNDERSTANDING

Provide time for students to meet with their teams to exchange the information they collected as a result of their research and to collectively form an understanding of the data. The use of concept mapping may facilitate the initial construction of the group presentation. At this time, groups should conceptualize their displays for the Multicultural Fair exhibition. Displays/activities should depict each of the cultural universals characteristic of the particular country studied.

Once groups have constructed an outline of their oral presentation, individual team members should assume responsibility for further developing the various sections of the presentation. Individual contributions to the construction of the exhibit will likely coincide with individual contributions to the oral presentation.

STEP FIVE : REHEARSAL OF ORAL PRESENTATION AND CONSTRUCTION OF DISPLAY

This week should be devoted to finalizing and rehearsing the oral presentations and to constructing displays for the Multicultural Fair.

In the event that parents are going to be invited to attend the oral presentations and exhibition during Multicultural Week, students should create an invitation-using whatever computer software is available to them-and take it home this week.

Engaging Parental Involvement

Invite parents to participate as volunteers in your classroom. Parent volunteers can assist students needing help and can otherwise monitor the use of the Internet.

When sending notes home with students to invite parental involvement, be very specific about the roles that they might assume and/or the tasks they might undertake while in the classroom.

Invite the parents of all of the students to attend the Multicultural Fair presentations and to visit the exhibits.

STEP SIX: GROUP PRESENTATIONS AND MULTICULTURAL FAIR

During Multicultural Week, each student will be an "ambassador" for the country researched by his or her small group.

Schedule a different group each day to give its oral presentation, allowing for a short question-and-answer period after each group report.

A portion of each day during Multicultural Week should be devoted to visiting the foreign exhibits. Each day, different groups should be scheduled as "ambassadors" and "tourists." All students should have the opportunity both to visit the displays created by their classmates and to present their own work.

USING THE PASSPORT AT THE MULTICULTURAL FAIR

The passport serves as a record of participation. Stickers of each country's flag (found in *The Ultimate Flag Sticker Book*, Dorling Kindersley Limited, 1993) may be scanned into the computer, allowing each student to maintain a record of his or her travels by importing an image of the flag of each country "visited" into the passport document.

BUILDING BRIDGES

To further elucidate the concept of diversity, provide the students with a grid that will facilitate their note-taking during the class presentations. The grid should provide a means by which students can note the commonalties and differences between the cultural universals of each country studied.

The final project assessment might be either a group or individual activity that requires the student to engage in some comparison-and-contrast exercises. For example, questions such as the following might be included:

- Which three countries studied by the class have systems of government that are similar to the United States?
- What country has rendered the most influence upon art in the United States?
- In which of the countries studied do children engage in education in much the same way as you do?

This final activity will not only facilitate classroom attentiveness during group presentations, it will enable students to find relevance in the Passport to the World Project to their everyday lives.

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ParenTech Home

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Last modified on 5/17/99.

Technology and Education

Does it

Compute?

ParenTech

Parenting in a Digital Age

Ameritech NCREL

A Partnership of Ameritech and NCREL

About ParenTech...

ParenTech is a unique technology information campaign that helps families "get a grip" on the technology that's all around us. A partnership of the nonprofit North Central Regional Educational Laboratory (NCREL) and Ameritech, ParenTech provides parents of middle schoolers (grades 6 to 8) with resources to help them understand the ways technology is changing how we learn, work, and live.

The ParenTech Resource Kit Includes:

Three 16-page Parent Guides

An interactive CD-ROM

A Web site, available at www.parentech.org

ParenTech also reaches out to middle schools with an informative Teacher Guide, a principal's tip sheet, and a colorful poster. In addition, ParenTech connects with communities through a "mini-exhibit" and an outreach partnership with the American Library Association.

Whether you're a parent, a teacher, a principal, or just someone who cares about families, technology, and the future, we hope you find ParenTech's resources interesting and valuable. Read the guides, visit the Web site, explore the CD-ROM at your library or school... and most important, keep learning with your family and with your community. Enjoy!

Thanks to all the NCREL and Ameritech team members, external advisors, and others who have helped make ParenTech happen. To learn more about the team, visit ParenTech's Web site and click on "What Is ParenTech?"

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Schools, Kids, Technology and...You!

The 3 Rs Rn't What They Used To Be!

Have you been in your child's middle school lately? Kids nowadays are doing all kinds of things: working in groups, researching facts on the World Wide Web, measuring the water quality of nearby ponds, and e-mailing historians in Hungary. These kids are going places and learning more than we ever did about all sorts of subjects. Their teachers may lecture less and guide and listen more.

In addition, the growing use of technology in classrooms pushes our definitions of what kids should be learning in school—and how they should be learning it. Technology also changes what it means to be an informed parent.

What's a Parent to Do?

You're probably wondering how you can help your middle schooler get the most out of learning with technology. You take an important step when you learn about the best ways that schools can use technology in the classroom. That means understanding technology's benefits...and limits.

It's important to remember that not all technology is created equal. Nor will it all change our lives for the better. Now, as always, the best thing any of us can do for our children is to instill in them a craving for learning, a curiosity to know more, and the confidence that they can master the technology in their lives.

You Hold a Special Key to Your Child's Success

Researchers have come to the conclusion that students learn better, feel better, and attend school more when parents are actively involved with their education. Family involvement is as important during the middle school years as it is when children are younger.

Even if your kids are exercising their independence, they still need your guidance and wisdom—now more than ever. Even if they happen to know more about computers than you do, you have more experience in life. You know what it takes to be successful. And the more you know about technology in education, the better you can help your kids learn. So dive in! Your tech-smart self starts here!

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What *Is* My Kid Thinking?

Understanding How Your Middle Schooler Learns

Zooming Towards Maturity! Ages 10-15...Doctors call this period of growth early adolescence. In education these are called *the middle school years*. It's a time of change for kids, not only for their bodies, but for their minds and emotions as well. They're making some pretty incredible leaps in their abilities to think about the world. Middle schoolers question the way things are, make new connections, and even think about *how* they think. It's a complicated age. Remember?

So let's take a look at what's special about middle school learners!

Middle Schoolers Are...

- **Building social skills and bonds.** Your kids probably enjoy working in groups because they're beginning to develop new ways of relating to people. They crave success and recognition among their peers—and sometimes seem to ignore everybody else.

Engaged learning is learning by doing, exploring, questioning, and collaborating. It's how kids learn best.

- **Forming an identity distinct from family, yet still needing guidance.** Middle schoolers want independence, yet still seek structure. They may feel isolated from adults and reluctant to share their feelings. At times they seem to resent adults.
- **Focusing on future relationships to the broader world.** Middle schoolers are aware that choices they make may have serious personal consequences. They may frequently change their minds as they develop interests.
- **Building new thinking skills.** Perhaps the biggest change is the development of "adult" thinking skills. Middle schoolers are starting to think more logically, abstractly, and reflectively.

With all of this going on, it's important that kids are exposed to the kinds of learning opportunities that meet all their developmental needs. That means finding out how kids learn best and then creating classes that teach them that way.

"Engaged Learning": The Heartbeat of Good Middle School Education

Education experts everywhere now know that "learning by doing" is the kind of education that benefits early adolescents most. Students learn best when they are making connections between academic subjects and the world around them, and then applying what they learn to solve complex problems. Many educators refer to this learning style as "engaged learning."

What does engaged learning look like? let's check it out:

Picture a middle school located just outside a midsize town in northeastern Wisconsin. A team of sixth-grade teachers representing language arts, math, social studies, and science are collaborating on an interdisciplinary project organized around the theme of "Adventure." More specifically, for the next three weeks, the sixth graders and their teachers will be immersed in the Alaskan Iditarod Sled Dog Race. Each day they'll link to Iditarod Web sites for updates as they track the mushers from Anchorage to the finish line in Nome.

Each teacher has learning goals for his or her particular subject. For example, Mr. Howard, the social studies teacher, wants to improve his students' investigative skills as well as their collaboration skills. He will divide the students into groups to study the history of Alaska and of the Inuit people. Mrs. Landan, the language arts teacher, wants her students to tap into their creative skills and develop their communications skills by writing daily updates of the race and delivering their speeches in class as if they were reporters broadcasting live from Alaska.

Analytical problem solving is the skill that Ms. Clark, the math teacher, hopes her students will improve upon. Her students will prepare for the race as if they were really in Alaska by studying the trail map and plotting times between checkpoints. They will also determine what supplies they'll need and how much they can pack into a sled without making it too heavy. Mr. Williams, the science teacher will

AN IDEAL MIDDLE SCHOOL IS ENCOURAGING, CHALLENGING, AND SUPPORTIVE

Middle school experts say schools—whether they call themselves middle schools, junior highs, or elementary schools—can best meet the learning needs of early adolescents by providing:

- ***Teachers who work together across all subjects*** **to design and use interdisciplinary lessons.**
- ***A school staff advisor*** **who looks out for their academic and overall success throughout the middle years.**
- ***Teachers who are trained in middle school teaching*** **or who are experienced in teaching early adolescents. They should use a variety of instruction styles, and guide and coach more than show and tell.**
- ***A curriculum that has strong connections to the real world.*** **The community should work with the school to give kids additional opportunities and new perspectives on what they're learning.**

Adapted from "This We Believe," published by the National Middle School Association. Available at **www.nmsa.org**

promote logical thinking skills with experiments focused on environmental issues such as climate, terrain, and physical demands on the mushers.

Keeping in mind that students have different learning styles, the teachers will encourage them to use various methods to conduct their research. To help them accomplish this task, the teachers will provide their students with a list of quality books, Web sites, and videos. The teachers will always be on hand to guide students through their investigations, but the students must learn to ask significant questions and determine the best ways to find answers. Students will be graded not just on how well they memorize facts, but on how they find and use new knowledge and skills.

At the end of three weeks, students will work in small groups to complete a final project. They will be given the freedom to choose their own topics and decide what methods to use for delivering their presentations. Perhaps one group will make a video about the types of sled dogs, their behaviors, and how they are chosen for racing. Another group might use computer software to show Alaska's geography and weather to demonstrate how these factors can either help or hinder the racers. The possibilities are endless, allowing the students to focus on their interests and direct their own learning.

Why Is This Engaged Learning... and How Is it Special?

- Students *have a real problem to solve:* How to win this difficult race. This kind of learning goes beyond just memorizing facts and taking multiple-choice tests. Students must apply what they learn from each subject and use a variety of skills to make new connections and gain real insights.
- Students *take responsibility for their own learning*. They ask significant questions and determine how to find the answers using different types of resources.
- These kids *are collaborating*. They're learning with and from each other as well as from their teachers.
- They *are being challenged*. They have to figure out strategies for finding necessary information, deciding what it means and how to use it.
- This kind of learning *interests students*. They're motivated to delve deeper into the topic and produce quality work. They like feeling a sense of control when it comes to their own learning.

Parent Action Goal:

Help your kids navigate their middle school years successfully.

Get back to school. Middle schools can seem like very different places from elementary schools (different schedules, more teachers, new rules), but your kids still need you to be involved. Do whatever works for you: attend parent-teacher conferences or PTA meetings, go to sports events on weekends, volunteer for special events, or just call your child's teacher to chat about what's going on in school and in class.

Shift gears Since kids' thinking skills change during the middle school years, your parenting strategies can change as well. Simple things you can do:

- Move from telling your kids the "right answer" to helping them ask their own questions. Ask, "What do you think?" before offering your advice—then find a solution together.
- Involve your kids in household decisions and problem solving. If you're making a decision (like whether to buy a computer) ask your middle schoolers to take an active role.

Check out...

www.mcrel.org's Pathways to School Improvement has many resources to help you learn more about engaged learning.

The Carnegie Corporation of New York has been a national leader in exploring what makes for good middle school education. Visit them online **www.carnegle.org.** Another leading voice in middle school reform is the Edna McConnell Clark Foundation at **www.emcf.org**

www.middleweb.com is chock-full of great information for parents and educators about these special years.

www.famoly education. Com and **www.parentsoup.com** offer plenty of practical advice for understanding the changes your middle schooler is going through.

The National PTA's **www.pta.org** has information on all kinds of issues, plus great links and information on technology, too.

The National Library of Education's Education Resource Information Center (ERIC) system consists of 16 clearinghouses, each specializing in a different aspect of education—from parenting to disabilities to assessment. Find them at **www.accesseric.org.**

What's the "Right Way"?

How Your Middle Schooler Can Learn With Technology

To infinity and beyond!" Buzz Lightyear® said it first in *Toy Story*, but he might as well have been talking about where many folks think technology will take our schools as soon as computers are put in every classroom. But is *this* "buzz" for real? Can your child's school really use technology to help learning take off?

The good news is yes, technology *can* be used to rocket your child's education into the stratosphere. But if you suspect there's more to learning with technology than just plugging in and logging on, you're right.

Technology in schools can provide students with some very real benefits. Specifically, they can:

- Put vast amounts of knowledge at students' fingertips so kids can learn more deeply about more topics and make more connections.
- Help kids learn to distinguish between reliable and unreliable sources of information, because they're checking out a wider variety of information resources.
- Reach kids with different learning styles. For example, to learn how two chemicals react when mixed together, your child could read text, interview a chemist via videoconference, or use a computer model to see how the molecules interact with each other.
- Connect kids with people, places, and activities outside the classroom and around the world.
- Help kids feel comfortable using technologies that will become part of their lives.
- Encourage kids to think about the role of technology in their futures and in the world.

Linda Roberts, director of the U.S. Department of Education's Office of Technology, sums it up. "It's not that students can't learn to be collaborative, good communicators, creators, and problem solvers without technology. But technology tools give them information in a variety of media and contexts that are richer. They go so far beyond text and give students many *more* ways to get to knowledge and develop true understanding."

Roberts gives an example: "Let's say we want students to learn about waste management: the amount of trash collected in a community and what form it takes; how much is collected every day; what happens if you don't collect it; and what happens when you recycle or eliminate one contributing factor to the trash on a weekly basis. That's a very complex problem. But kids can enter these variables into a spreadsheet and use visual database tools to help them think through these questions. And then they're probably going to be a lot better at finding, using, and analyzing information to solve *other* complex problems. That's really what educational technology is about."

It's in the Way That You Use It!

Right now, you may be saying to yourself, "I know why technology belongs in my kid's classroom. Now I want to know *how* they should be using it!" A good question...with some very good answers. The following four principles can help you understand how schools can use technology for engaged learning!

Know the Learning Landscape

Although there are lots of classroom technologies (see pages 6-7), research reveals that there are really just four major ways that students use *any* kind of technology for learning:

1. **To inquire and explore:** Technology tools can help your middle schooler get his or her hands on text, numerical information, visual examples and interactive models to help ask and answer questions. The Web and multimedia CD-ROMs are some of the most common inquiry tools in schools today.
2. **To communicate:** Technology has profoundly changed the way people communicate. In middle school, your youngster can use a word-processing program to write, send e-mail to other students or to experts, develop a multimedia presentation, or collaborate with students far away through videoconferencing.
3. **To create:** Kids can use technologies to help them express creative ideas through art, music, animation, or audio/video. Students also can use special software or actual programming languages to create new computer applications or databases.
4. **To tutor:** The fourth way kids can use technology for learning is also one of the most common. For many years, educational developers have made special programs to help kids learn basic reading, grammar, spelling, and math skills. In fact, this was the computer's main use when it was first introduced into schools.

   "Drill and practice" tutorials *can* help kids, but should be used in moderation. When students use

Schools should use technology to support learning—not the other way around.

the computer only for tutoring, their problem-solving skills may languish. There's a lot of evidence to support the belief that *all* students learn best when they are challenged to solve complex problems.

(Adapted from the research of Barbara Means; and Benjamin Bruce and James Levin)

Oh, Grow Up!

In middle school, your child's thinking abilities start to really "grow up." And that means the technology activities in middle school should mature as well. Studies show that middle schoolers learn best when they use technologies the same ways adults do: mostly to *explore, create, and communicate* (and only occasionally to tutor). It's no coincidence that "grown-up" technology activities support engaged learning!

Cheryl Lemke of the Milken Foundation states, "Science, math, communications, and the social sciences are very different in the real world because of technology, and so technology in the classroom should model that. If we have students act as scientists in their classes, but when they get out in the world they find out science is done very differently, we've really done our kids a disservice."

Think Quality, Not Quantity

It's a common question from parents: How many hours a day should my child be using technology to learn? The right answer can range from "zero" to "8 hours plus" depending on the learning goal at hand. Any technology should be used only when it helps to expand and accelerate your child's learning. In essence, if technology doesn't help students learn *more, faster, and/or better,* turn it off!

Blend Well Before Using

Technology shouldn't just be an occasional keyboarding class that's separate from "regular" subjects. Instead, technology should blend seamlessly into challenging activities in *all* subjects. Roberts notes, "Parents ought to see computers being used throughout the school. They should see students using computers to do assignments in virtually every area of the curriculum."

So What Does It Look Like?

What Linda Roberts looks for in a classroom is "kids who are applying skills to real-world problems. I expect to see students doing very careful, thoughtful research; solving complex, realistic problems; working with other students. They should be actively gathering information, evaluating it, thinking critically about where that information is coming from.

"And students who use technology should be reading much more than they would otherwise, because they're pulling in more resources and thinking harder about their work. I also look to see that students are using communication tools like e-mail.

"Finally, I want to see students using data retrieval tools—like CD-ROM encyclopedias, multimedia tables, and original source materials that provide interactive models and simulations—particularly in math and science, so they better understand the principles behind the computations."

If all this sounds too advanced for middle school, think again. Cheryl Lemke says, "I think our expectations for students aren't high enough. Kids need to feel that they're taken seriously, that the work they do is meaningful. If we set the mark high, provide milestones along the way, and if we support kids and really reward them only when they've met those standards, then students will excel and accomplish great things."

Parent Action Goal:

Learn about the technology in your child's middle school.

Check with your child. Ask, "How are you using computers and other technologies in school? What are your favorite things to do? What would you like to learn next about technology?" Ask to see the schoolwork your child does using computers.

Join your school's technology Paning team All public schools and many private schools are required to have technology plans that outline how students and teachers will use technology for learning. Your school needs your input! Join the planning committee and make a commitment to helping your child's school use its technology in the best possible ways.

Help your school create a Parent Technology Night (or a Saturday tech Breakfast). Parent-teacher-student open houses are a great way to learn what's going on in your child's school. You also can learn a few tech skills yourself!

Check out...

www.edgov/technology is where you can find the U.S. Department of Education's technology Web site, with dozens of resources to help you learn about technology in today's schools.

www.ameritech.com/education is home to the Family and Education Outpost, Ameritech's education Web site. The site has a great database of more than 400 Web sites that you can search by subject and grade level—including middle school.

Technology can help kids with all kinds of disabilities achieve, too. For more information, check out the Council for Exceptional Children at **www.cec.speed.org.**

is a research-based guidebook with tools that can help you learn more about the connections between technology and engaged learning. Available online at **www.ncrtec.org/capacity/plug/plug.htm.**

The continued —

A Parents' Guide to Technologies

THE TECHNOLOGY	RELATED TERMS AND PRODUCTS
The World Wide Web/the Internet: An enormous network of computers around the world where people and organizations can post information, graphics, video, interactive programs, and so on. Anyone who has an account with an Internet server can create a Web site—from kids to corporations.	Web browser (programs you can use to surf the Net) brand names such as Netscape, Mosaic, or Internet Explorer Web programming languages such as Java or HTML code
E-mail: People can send and receive letters in electronic format over the same network that the Web uses. E-mail can be sent and received in a fraction of a second. Some schools may provide e-mail accounts for classrooms or students.	E-mail program brand names such as Eudora, Exchange, Outlook, Netscape
Educational Software: A wide variety of computer programs designed to teach kids specific skills or to give them a problem to solve. They are produced by companies, nonprofit organizations, or even teachers with programming skills. The software often takes the form of games, stories, or other playful activities.	Company names such as Broderbund, Learning Company, Knowledge Adventure, Creative Works
Word Processing Software: Programs used to create written documents. In addition to typing, most have built-in spelling and grammar checking programs.	Software brands such as Microsoft Word, WordPerfect, ClarisWorks, Microsoft WordPad
Database Software: Programs used to build organized collections of information (text, pictures, numbers). Users can then use preset features or program the database to do calculations that combine and process the data in different ways.	Software brand names such as Excel, Lotus
Presentation Software: Programs used to create multimedia "slide shows" that combine words, charts, video, and audio.	Software brand names such as Power Point, SlideMakerPro
Graphics and Desktop Publishing Software: Programs used to create computer drawings, animation, or charts. They can also be used to design written documents with pictures, graphics, and professional-looking design.	Software brand names such as Harvard Graphics, PaintBox, Adobe Acrobat, Microsoft Draw, QuarkXPress

kay. It's time to get *really* specific. Whether you're a technology expert or a complete beginner, you've probably wondered what technologies you should see in your child's classroom. There's no single "right" technology combo for every class. Whether your child's school is chock-full of the latest, most expensive equipment or making do with just a few hand-me-down computers, teachers and students *can* use the technology they have for engaged learning. For all you busy parents, here's a quick roundup of some common classroom technologies and how your middle school can use them for engaged learning!

WHAT KIDS CAN DO WITH IT	WATCH OUT FOR
"Surf the Web" to find info on almost any subject. Use Web page authoring software to create Web sites that show others their projects or what they've learned. Think about what makes information reliable: Who created the site? Where is the information from? Where else do you find this information? Do other sources have competing points of view?	Kids believing everything they see on the Web; using the Web as the only source of information; getting lost in information rather than learning to control their Web searches. Most schools have an Acceptable Use Policy (AUP) that outlines the ways students will use the Internet and how the school will protect kids from inappropriate information and keep them safe. If you haven't seen your school's, ask for a copy.
Write and get responses from experts and fellow students anywhere in the world. Create or join listservs (group e-mails on a specific topic) to connect with networks of people who are sharing thoughts and questions on all kinds of topics.	See note on AUP above.
Solve complex problems that are also interesting and fun, through simulations or games. Express their thoughts and create music or artwork or construct models of all sorts.	Glitzy software that entertains kids but doesn't challenge them; software with lots of repetitive activities or memorization (okay for very young kids, but not appropriate for middle schoolers); folks who think schools must have special commercial software to teach kids well (all kinds of software can be used educationally). For tips on selecting educational software, check out the Children's Software Revue (www2.childrenssoftware.com/childrenssoftware) or the California Instructional Technology Clearinghouse (http://clearinghouse.k12.ca.us).
Write and edit their work speedily and efficiently. Kids can spend more time writing and less time recopying.	Lots of class time spent on software skills, not learning how to construct a good written piece; spelling and depending too heavily on grammar checker (those programs aren't perfect!). Studies show that although kids who use word processing software write more, faster, and enjoy it more, they don't necessarily write *better*. It takes skilled teaching to actually help your child's writing improve.
Perform calculations that help them understand how different pieces of information fit together and relate to each other. Build their own databases to learn what information is important to record and in what form.	Kids who use databases but don't learn the principles behind them (e.g., statistics or data organization).
Learn how to organize information concisely to make a point, persuade an audience, or communicate effectively. Use presentations to help them become more polished speakers.	Spending more time on the look of the presentation than on the content that goes into it.
Build their visual skills and learn to present information effectively about what they've learned.	See "Presentation Software."

For an expanded chart, visit ParenTech's Web page at www.parentech.org. Click on "Resources for Parents."

Speed Bumps on the Digital Highway

What Can Keep a School From Using Technology Effectively?

It's a fact that computers can significantly improve education and learning...and it's a fact that most schools have computers. So why isn't technology helping every school roar down the digital information highway?

Frankly, when it comes to educational technology, equipment is just the beginning. Several barriers can keep schools from making the best possible use of their technology investments. Here are some of the most common.

Many Schools Lack Access to the World Wide Web. Internet or Inter-*not*?

The Internet can give students from all walks of life the chance to learn knowledge that was once available only to scholars, researchers, and the well-connected—*if* it's available in their classrooms. Yet schools with higher populations of poor and minority students tend to have far less Internet access. In addition, statistics about the Internet in schools are often misleading; they typically don't indicate the location of wired computers or whether teachers can or do take advantage of that Internet access in their lessons. It's projected that by the year 2000, 87 percent of U.S. schools will have Internet access. Today, only 14 percent of U.S. *classrooms* have this access.

In 1998, 63% of high-poverty schools had Internet access compared with 88% of high-income schools.

National Center for Education Statistics, 1998

Many Schools Are Still Playing Computer Catch-Up

Outdated computers, computers not equipped to run CD-ROMs, computers without adequate memory to run the kinds of software teachers would like...does this sound familiar? With computer capabilities changing so dramatically and so quickly, it's no wonder that our schools can't keep up.

DID YOU KNOW?

Eighty-five percent of U.S. schools have multimedia computers (i.e., computers with CD-ROM and/or Internet capabilities), but the ratio of students to those computers is 16:1.

(Educational Testing Service, Computers and Classrooms 1997, Quality Education Data, 1997)

Added to this burden is the fact that many of our schools may not have *enough* equipment. While 98 percent of all schools reported owning computers in 1997 (Educational Testing Service, 1997) only about 4 percent of American public schools have an "ideal" computer-to-student ratio of 1:5. The average national ratio is 1:7 (Market Data Retrieval, 1998).

Technology also tends to be less accessible in schools with large minority populations and large numbers of students with family incomes below the poverty level.

Computer Labs Get Less Use

Computer labs can be great places to get a lot of kids hooked up to heavy-duty learning opportunities. Unfortunately, they're just not being used enough. Many students in classrooms without computers take only occasional trips to the labs. When they do go to the lab, they often use the computers to learn mechanical skills or to play computer games that don't do much for their learning. Such arrangements don't give kids opportunities to use technology as a tool in their "regular" learning activities.

Many Teachers Don't Get the Training or Time They Need

Continuing education is essential for teachers. In fact, it's the single most important factor in whether your child learns well with technology! "Teachers need to spend time developing lesson plans and units that integrate technology into the school's regular learning goals. They need to try them out and revise them over time and spend time with colleagues sharing ideas on how they work," says Randy Knuth, director of NCREL's North Central Regional Technology in Education Consortium. These are time-consuming tasks. "Change takes time," Knuth explains. "It doesn't happen overnight. It's a constantly evolving process of creating and refining a vision of what learning

Experts agree that about 30 percent of your school's technology budget should be used for continuous teacher training.

should look like. As your skills at using technology improve, you see new opportunities and understand more clearly what technology can do."

Experts generally agree that approximately 30 percent of your school's technology funding should be used for continuous teacher training throughout the school year. The problem facing teachers today is that as curriculum demands grow larger, they have less available time. Teachers need to have time in their schedules to work together and integrate technology across all classes.

Many Schools Lack Adequate Technical Support

Many schools struggle to keep their computer systems up and running. Ideally, middle schools should have a professional technical support person available to solve problems with networking, installing software, etc. Yet schools often assign these tasks to teachers or other instructional staff who may not even be trained in technical support. The result is a loss for both teachers and students of valuable teaching time. Schools need to have enough technical support to keep all equipment running smoothly and to troubleshoot operational problems.

Linda Roberts notes, "I think parents can be very important in helping schools overcome barriers. They can ask the school what their plan is for using technology, and how their plan for technology is tied directly to their academic plan. Then parents can make sure that the school is providing not only computers and getting those computers connected among classrooms and externally to the Internet, they can also ensure that teachers are getting support and training to integrate these tools into their teaching and learning activities.

WHERE ARE COMPUTERS LOCATED IN YOUR SCHOOL?

Classroom	**44.9%**
Computer Lab	**45.6%**
Library	**7.7%**
Other	**1.8%**

(Market Data Retrieval, 1997)

"In addition, parents who have technology knowledge or access to technology resources through their work can think about how they could be part of the effort to build a truly integrated technology program in their child's school.

"I really believe that technology can be a bridge between kids and parents during these years. I have this vision of parents coming to school after regular hours and sitting side by side with their kids—being astounded by what their kids know. Parents can allow their children to be their coaches and mentors in technology, but at the same time, provide their kids with their good judgement and what all the technology means."

Parent Action Goal:

Be an advocate for your child's school.

Be a fact-finder first. Visit your child's school to learn what barriers teachers and others experience in using technology. How do they describe what's working and what's not? What do they think would help? Join your principal and the PTA/PTO to explore solutions for your school's challenges.

Start spreading the word. can help your school by working with them to raise public awareness of the educational technology barriers that must be overcome. You might help start a letter-writing campaign or get a public meeting under way to get the whole community involved. You can even help make local businesses and community groups aware of how important technology is to all children's education.

Do your bit. Whether it's time, equipment, technical know-how, or just enthusiasm, your contribution to the school is important. If you don't have lots of time, tell your school's prinicpal or parent coordinator what time and talents you do have, and ask them how you can be the most helpful.

Check out...

The federal "e-rate" program provides discounts to schools and libraries for Internet wiring and access. The School and Library Corporation manages this program; you can visit them online at **www.slcfund.org**

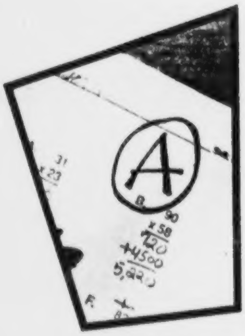
Visit the U. S. Department of Education's Web site for great resources, such as the *Resource Guide to Federal Funding for Technology in Education* (select Federal Resources) at **www.ed.gov/Technology/**

NCREL's *Learning Through Technology: A Planning and Implementation Guide* offers knowledge, tools, and strategies to help your school overcome barriers and reach educational goals. Available online at **www.ncrel.org/tandl/homepg.htm**

Check out *The Distance Learning Funding Source Book: A Guide to Foundation, Corporation, and Government Support for Telecommunications and the New Media* by Arlene Krebs (1999).

The Evidence, Please

Does Technology *Really* Improve Learning?



As you watch your kids zip around the World Wide Web on parent night; as you hear about the cool software they're using in science class; as you think about how much all of these computers cost, do you ever wonder if all this technology really makes education better?

You're not alone. Over the past ten years, even as districts make major technology investments, educators, legislators, and researchers have been asking for proof that technology makes a difference in education. After all, the U.S. spent more than $5 billion on school technology in 1997 alone. Like you, they want evidence that technology improves student achievement.

But asking if technology in education is effective is sort of like asking if silverware is effective. You need more information...like, "What kind of silverware?" "What's the goal?" A butter knife won't help you eat a bowl of soup, and a spoon won't carve a turkey. To judge technology's effectiveness, researchers have had to ask:

- "Which type of technology?"
- "What's the teacher's purpose in having the students use the technology?"
- "What other classroom factors affect how the technology gets used?"

While all the news isn't in yet—after all, computers are only now becoming a pervasive part of many schools—findings indicate that technology can be very effective at enhancing the school experience—most noticeably in middle school and beyond!

5 Ways Technology Can Make Schools Better

1. **Technology Can Build Students' Motivation in School**
   Everyone knows that kids think technology is fun. Many studies confirm that kids say they're more interested in schoolwork when it involves computers.

2. **Technology Can Improve School Culture**
   Teacher training in technology can improve a school's culture, which also tends to lay the groundwork for improved test scores. Cheryl Lemke notes, "What we're seeing is that when schools use more technology—and teachers are well-trained to use it—then the complexity and level of instruction goes up and, as a result of that, test scores go up."

3. **Technology Can Improve Test Scores**
   In a recent national study by the Educational Testing Service, eighth-grade students who used computers to conduct mathematical simulations performed better on standardized tests than students who didn't use computers. However, eight graders who used computers mostly for "drill and practice" performed *worse* on tests than students who didn't use computers at all!

   It's also interesting that in the math classes where test scores rose, kids actually used computers *less often* than the students who used them for drill and practice.

   This study supports others that show computers tend to raise test scores more in subjects that are naturally more structured, like math. In less-structured subjects (like writing), computer use doesn't make as much of a difference on standardized test scores.

CHECK OUT...

The Milken Exchange on Educational Technology: www.milkenexchange.org

Education Week's *Technology Counts '98* Report: www.edweek.org, click on "Special Reports"

4. **Technology Can Improve Other Measures of Achievement**
   Teachers can use technology to help kids tackle challenging, "grown-up" problems that they couldn't without the information-processing powers of computers. And many studies have shown that when kids learn through doing such authentic tasks, they do better on performance-based assessments, not just multiple choice tests.

5. **Technology Can Help Underperforming Students and Those With Disabilities**
   Computers allow students with many different abilities to work at their own pace and to work collaboratively with other students on significant projects. Several studies have shown that computer activities can help diverse kids connect through their common enthusiasm for technology!

To the Keyboard...

And Far Beyond!

What should middle schoolers be learning to do with technology? More than you'd expect!

Educators across the nation are working to establish technology learning goals for each grade level. And while they may vary from district to district, most research-based standards have some common threads.

The Association for Supervision and Curriculum Development's (ASCD) Technology Planning Guide says students of *all ages* need to be:

- Skilled information seekers, navigators, and evaluators.
- Critical thinkers, analysts, and selectors of information and technology.
- Active problem solvers.
- Creators of knowledge, who combine and synthesize information using different types of technology.
- Effective communicators with technology.
- Technologists who have the skills to install and use technology for daily life and learning.
- Responsible citizens in a technological age.

The NETS (National Educational Technology Standards for Students) standards will give you a good feel for the high level of technological know-how that experts feel middle schoolers should master:

1. Use e-mail, the Internet, and other information technologies; understand how they affect today's society.
2. Comfortably work through routine computer hardware and software glitches.
3. Use computers and associated technologies responsibly and ethically. Understand the consequences of irresponsible use.
4. Use software, Web tools, environmental probes, graphing calculators and other technological tools to conduct research.
5. Use a variety of computer-related technologies independently and cooperatively.
6. Use technology to design, develop and publish Web pages and videotape presentations that communicate curriculum concepts to others.
7. Work with peers, experts, and others via e-mail and other collaborative tools to investigate and solve curriculum-related problems.
8. Choose and use appropriate technology resources to solve problems and accomplish tasks.
9. Understand how computers, software, and networks work.
10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of sources of information available on the Internet.

Linda Roberts says, "I believe that we must have our students all be fluent readers and proficient writers because those are the essential foundations for anything and everything our students will need to do in tomorrow's world. But I also think it is very important for our students to be technologically literate as well. Technology fluency or literacy is in essence, the 'new basic skill.'"

Parent Action **Goal:**

Consider what goals your school is achieving with technology.

Join the standards conversation.

No matter how fancy they might sound on paper, "technology standards" are just descriptions of what kids should know and be able to do at various grades. You don't need to be an expert to talk with others about the standards you want your kids to meet. Participate in the conversation by becoming a member of your school's technology committee, talking with your child's principal, attending PTA or school board meetings, and supporting public meetings to discuss what your school's standards are and what they mean.

Learn about your school's and state's technology standards.

It's really not hard to find out what standards your state and your school have for learning with technology. Just ask your school to send you a copy of their learning goals for using technology. What are the important learning goals? What should your child know and be able to do by the time he or she leaves middle school?

Check out...

Many states have their learning standards online. You can link to your own state department of education's home page by going to **www.ed.gov/Programs/bastmp/SEA.htm**

The American Association for the Advancement of Science (AAAS) has compiled comprehensive benchmarks for science and technology education by grade levels. Visit them online at **www.aaas.org** click on "Project 2061."

The Mid-continent Regional Educational Laboratory's (McREL) online database at **www.mcrel.org** is a great place to explore all kinds of standards from research and from states nationwide.

The International Society for Technology in Education (ISTE) has developed standards for what teachers should know and be able to do with technology in their classrooms. Visit them online at **www.iste.org** click on "the NETS project."

The Council for Basic Education is a leader in assessing learning standards across the curriculum; they're online at **www.c-b-e.org** The Fordham Foundation has also collected exemplary standards online at **www.edexcellence.net**

Schools and Families...

Connecting With Technology!

As a parent, you can be a powerful partner for change when it comes to technology in your child's school. When schools and families use technology together, all sorts of exciting changes can happen. Here are just a few of the reasons it pays to connect with technology!

1. **Parent-Teacher Relationships Grow Strong With Voice Mail, E-mail, and the Web.**
   A *school voice mail system* is one of the most effective, yet inexpensive ways that schools can use technology to connect. Parents can leave private messages for teachers 24 hours a day and teachers can get in touch with parents when it's most convenient for both. Kate Gill Kressley, director of the Indiana Center for Family, School, and Community Partnerships, says, "Voice mail provides a different comfort level for most parents that makes a huge difference. There is no substitute for face-to-face interaction between parents and teachers, but technology can be enormously helpful in expanding relationships that have begun in that old-fashioned way."

   E-mail can connect parents and teachers as well. Electronic messages can provide private, two-way messaging benefits similar to voice mail. E-mail listservs can go a step further: Teachers can start a listserv for their student's families or schools can start up special-interest listservs. Schools can even send out parent surveys via e-mail to gather information about families' interests and needs.

   A *school Web site* can keep parents up to date by posting everything from the school calendar to PTA meeting notes to classroom assignments. Web sites can even have "just for fun" photos and student artwork. Cheryl Lemke feels that Internet and e-mail interactions between students, teachers, and parents and between parents and teachers have great potential. She suggests that schools use new technologies to post homework assignments and wonderful projects that students are doing on the World Wide Web, as well as resources that parents can use to help their children learn better.

2. **Parents Are Student, Too, at School-Hosted Computer Classes.**
   School-hosted computer classes for adults can help parents learn what their children are learning. Technologically savvy parents are better able to be partners in their children's education. Lemke believes that "it's important that families learn together about the challenges and opportunities the Internet provides so that parents are as informed as their adolescents are about what's available across the 'Net."

   Technology training can even give many parents a "fresh start" in getting involved—especially those who haven't had positive educational experiences in the past. Sue Ferguson, director of the National Coalition for Parent Involvement in Education (NCPIE), recommends that schools sponsor technology training for families at libraries, community centers, or churches as well as at school. "These can be great places to reach out to parents who are wary of schools," remarks Ferguson, "The parents feel they're on 'neutral ground.'"

3. **School Technology Can Support Community Development!**
   In 1996, the Illinois State Board of Education invited 36 of the state's poorest communities to join a school technology planning project. One condition: each community had to establish a six-person team that included the local superintendent, a school board member, a community member, a student, a teacher, and a local principal.

   Notes Lemke (who spearheaded the project), "When we first started, each community was required to host a town meeting. We were told in advance by all 36 superintendents, 'My community is not interested in technology, they don't understand

WHAT A WEB SITE CAN PROVIDE PARENTS

- School schedules (vacation, hot lunch, sports events)
- Faculty biographies
- Info on school policies and learning goals
- Parent-community surveys
- Homework assignments and grading info
- Fun family activities
- Helpful parenting tips
- Info on other community resources

...and much more!

"If you think education is expensive, try ignorance."

Derek Bok

it, and they will never support technology funding for this isolated, depressed area.'

"But when they held their meetings, community members to a letter understood the need for technology, and they were delighted to be a part of technology in the schools. In some cases 50 percent of the community came to town meetings! And they were completely supportive two, three, four years into the process. It really was tremendous.

"Part of the reason the communities were so supportive is that the schools actually made sure that the technology in schools would also benefit community members. These schools made sure that the school was open until 10 o'clock four nights a week and on Saturdays so that parents and community members could also use the computers." Lemke adds that in some cases, schools paid for computers to go into libraries or community centers in order to help families get access to them after school hours. "The schools didn't isolate their technology," she explained. "It was a whole community system supporting students *and* the community."

4. **School Technology Fosters Support in the Business Community, Too.**
   When local businesses, organizations, and community members become part of the learning loop, everyone benefits. Technology activities can bring people to school who might not otherwise come through the door. Local businesses, organizations, and community members with technological skills can donate computers, training, and/or technical support to classrooms. How about high-tech "mentors" from the business community for teachers or families?

5. **Parents Can Support Their Child's Learning at Home.**
   When parents know and understand the ways their child is using technology at school, they are more likely to become involved with their child's learning. Web sites can give parents access to detailed information about homework assignments, teachers' grading systems, and other information that they don't always get otherwise. Gill Kressley states, "Families must understand how critical it is that they know what the curriculum is all about."

   In addition, when teachers post family learning activities on school Web sites to support regular classroom activities, parents can actually *be* part of their kids' homework assignments!

DID YOU KNOW?

Only 12 percent of U.S. elementary and middle schools report using the World Wide Web to communicate with parents.

More than 40 percent of parents never attend school programs—although more than 75 percent of middle school students say they'd like their parents to be more involved in school.

Source: Milken Exchange on Educational Technology

Parent Action Goal:

Connect with your child's school through technology!

Build your own skills. Remember, your kids learn from watching you. You don't have to be a technology expert to start learning with other members of the school community. School tech activities can be a learning opportunity; you'll learn more about technology, meet new people, and strengthen your connection with your kids at the same time!

Get students involved. Middle schoolers can learn valuable skills and reflect on what they learn when they help build Web pages or decide what message will go on this week's voice mail system.

Help put out the welcome mat. Work to help keep the school open into the evening so parents and kids can use technology resources together. Connect with the local library so online resources there can support class activities as well. Offer to be at school to help staff these hours. If funds aren't available to put technology in the school, perhaps it can go in the library with a program to connect to schools.

Check out...

Web66 is an online clearinghouse for hundreds of school Web pages nationwide. Available at **web66.coled.umn.edu/schools.html**

The National Network of Partnership Schools brings together schools, districts, and state that are committed to developing and maintaining comphrehensive programs of school-family-community partnerships. Available at **http://scov.csos.jhu.edu/p2000/p2000.html**

The Education Trust at **www.edtrust.org** has information about family-school Compacts for Learning.

You'll find information on parent involvement on the NCREL's Pathways to School Improvement at **www.ncrel.org/sdrs/areas/issues/envrnmnt/famncomm/pa100.htm**

Also visit the National Coalition for Parent Involvement in Education at **www.ncpie.org** and the Partnership for Family Involvement in Education **www. pfie.ed.gov**

The Indiana Center for Family, School, Community Partnerships is online at **www.partners-in-learning.org**

A Step in the Right Direction

An Indiana-based Technology Project Moves into Middle Schools

Indiana is known as the Crossroads of America, home of the Hoosiers, host of the Indy 500, and birthplace of David Letterman. But from now on, when you think about Indiana, think of it as the birthplace of the Buddy System Project.

Since its conception in 1988, the Buddy Project (or BuddyNet) has built strong partnerships between home and school using technology. There is a formula to the success of the Buddy Project and Alan Hill, president of the Corporation for Educational Technology, where the program is administered, shares it.

"The success of the Buddy System rests in the combination of these essential elements: providing parents with a home computer, low-cost educational software, and access to the Internet; school support and training; and most important, teacher and parent participation." The Buddy System was one of the nation's first programs to connect families to schools by loaning computers to homes.

Initial evaluations of BuddyNet point to positive strides. Besides improved test scores and more professional development for teachers in many schools, an article in *Education Week's* "Technology Counts" issue reported that three-quarters of sampled parents said Buddy helped them get involved with their children's homework. More than 40 percent reported that the computer helped their families engage in activities together. Many schools informally report that Buddy parents are involved in their children's education on a daily basis—attending meetings, contacting teachers via e-mail, and assisting with homework.

The Buddy Project was initially implemented in elementary schools with two goals: extending the learning day into the home and increasing parents' involvement in their children's education. But as those grade schoolers grew and progressed into middle school, it was only natural that Buddy should, too.

Now, the Buddy Step-Up program helps middle school students further develop their technology skills by having them help out their teachers who need technology training and support. That's right, middle schoolers teaching their teachers!

The Buddy Step-Up program is part of life for students, parents, and teachers at Sarah Scott Middle School in Terre Haute, Indiana. Although the Step-Up program is only in its pilot phase, the school has actually been involved with the Buddy System Project since 1992. "In 1992, the Corporation for Educational Technology approached us and said they were looking for an experimental middle school to expand the Buddy program," Mike Hardesty, Sarah Scott's Buddy site coordinator, recalls. "We were the first middle school or junior high to become involved with the program."

The program was introduced to the school in three stages. The first stage involved sending computers home with the teachers to familiarize them with the new technology. Next, a computer lab was set up at the school. The final step was to send computers home with the students and to provide training for their parents.

According to Mike, teachers develop their technology skills through individualized training. "It's a great partnership because the students know the technology and the teachers know how they want to incorporate it into their lessons," explains Mike. "Teachers direct the one-on-one sessions with their Step-Up students and, therefore, receive training tailored to their needs."

John and Lesley Wilson are the Step-Up parent leaders at Sarah Scott. They work with Mike to coordinate parent-training sessions, another important part of the program. John and Lesley start by giving parents the basics, such as how to navigate through word-processing programs and how to use the Internet. They really want parents to become comfortable with the computers and the software.

Some parents participating in the program find the technology skills they learn reach far beyond their home and school. According to Mike, these parents are using their newfound computer skills to get an edge at work. "Part of our success story," says Mike, "is the fact that some parents come up to me (especially the stay-at-home moms), and say, 'I got a job or I got a better job because of the computer skills I've learned by having a computer at home.' Even with the limited equipment that we have, they are still able to teach themselves how to use the computer programs and basics."

John and Lesley's son, Nicholas, is a sixth grader at Sarah Scott and has increased his comfort level with computers. Lesley says it's to the point where he would rather write a story using the computer than using a pencil and notebook. "He learns differently than us," states Lesley. "My inclination is to go to a book to find whatever I need to know, whereas he gets on the computer and uses the encyclopedia and it's much faster."

The Step-Up program at Sarah Scott has faced a few challenges. "Over the course of the year, we've tried to set up a few training sessions for parents to learn computer basics," remarks Lesley. "We realized that the training would be more effective if we ran a session every month and had parents come into the school's computer lab. Right now we're in the process of getting parents' input in order to update the training schedule."

Perhaps the greatest challenge was adapting the Buddy Project to meet the needs of middle school students, teachers, and parents. Mike explains, "We have to implement the Buddy Project differently than elementary schools simply because our daily schedule is different. In middle school your English teacher is different from your science teacher, and there are often different students in each class.

"So instead of working all day long on a project, kids only have about 40 minutes for each subject. If only a few of the kids in a given class are in BuddyNet, you can't make the most of the computers to do interdisciplinary projects because kids don't have consistent access."

Still, Hardesty notes, "We've had kids that go to high school and can teach the high school computer teachers things, because they've had computers at home and school since they were in fourth grade."

To learn more about the Buddy System Project and Step-Up program, visit the BuddyNet Web site at www. buddynet. net. Discover how the project has helped the students, parents, and teachers at Sarah Scott Middle School by visiting their Web site at www.vigoco. k12.in.us/~scotms.

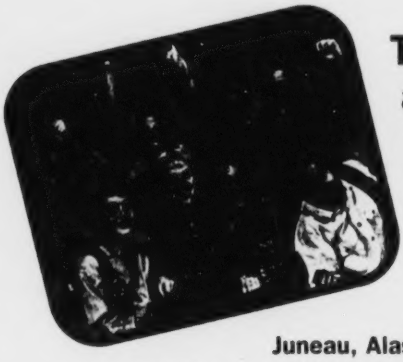
TIPS FROM THE BUDDY SYSTEM AND OTHER COMPUTER-SHARING PROGRAMS

If you are part of a group that is looking to help your school start up a program like this, here are some tips to keep in mind:

- Plan on *continuous training* for teachers and parents. Monthly trainings, perhaps supplemented with *"drop-in"* training evenings or weekends, work better than putting all your training energy up front at the start of the school year.
- Put some of your funds to work to make sure there's a *teacher on "special assignment"* to oversee the project. Otherwise, time strains may cause the project to fizzle out. This teacher might take a partial or a complete break from his or her regular teaching duties to run the program.
- Try to provide *insurance for all computers* so families without homeowners' or other insurance aren't kept from taking one home due to liability problems.
- You probably won't have enough money to give *all* kids computers. That's why *partnerships* with libraries, local companies with computer labs, community colleges, and others are important. You may decide to give out loaned computers every term on a lottery system or based on parents' access to computers at home or work.
- Ensure that computers are provided *for a whole classroom of kids* (through home computers or community-based access) so teachers across different subjects can design *interdisciplinary* lessons that use the computer to make connections.
- *Spread the word.* One challenge is that the parents who are first in line for computer-sharing programs may be those who are already comfortable with technology. Try *reaching out* through churches, community centers, or local papers to bring in families who haven't been involved with the school or technology.
- Consider *giving teachers home computers,* too. In Chicago and suburban Illinois, some schools give teachers laptops in exchange for time spent teaching computer skills classes to parents.
- Decide what *parent involvement and student achievement results* you want from the program and how you will measure these results. A local college of education or your district may want to do a formal evaluation of your project so other schools can learn from your experience.

Family Fun Page

...Just a Little More



Technology and Education Go Hand in Hand... See for Yourself

Juneau, Alaska—Middle schoolers at Dzantik'I Heeni Middle School have helped to preserve their regional history with the use of video technology. The students created documentaries about local heroes with accompanying still photographs and written testimonials. Also, another group of students created a Web site designed to help people learn about the rich history and folklore of Alaska. **www.jsd.k12.ak.us/www/schools/dzh/dzh.html**

Palatine, Illinois—A little closer to home, students at Plum Grove Junior High School developed a virtual field trip to the Adler Planetarium in Chicago. The students and teachers had to learn some pretty high-tech computer programs to create this Web site that demonstrates the story of astronomy throughout the ages. **www.ccsd15.k12.il.us/ESC/pgadler.htm**

Omaha, Nebraska—Students at Westside Middle School learned all about human rights by using the Internet to search library resources and news reports. They also contacted foreign governments around the world to find out more about their policies and practices. The students identified countries violating human rights and created multimedia presentations that were mailed to the leaders of those governments in hopes of sparking reforms. **www.wst.esu3.k12.ne.us**

The JASON Project—Distance learning at its finest! This year-round scientific expedition is designed to excite and engage students in science and technology and motivate and provide professional development for teachers. Students and teachers around the globe can link to researchers and explorers in the field via live satellite and Internet broadcasts. **www.jasonproject.org**

Questions for Reflection...

Ways we can help our school use technology better:

1. ______________________________
2. ______________________________

Ways we can lend a hand to help our school get the technology we need:

1. ______________________________
2. ______________________________

Ways we can help our school use what it's got to help kids learn and connect families:

1. ______________________________
2. ______________________________

More exciting Web sites...

www.glef.org The George Lucas Educational Foundation believes children should have challenging and engaging educational environments where they have access to interactive technologies and are supported by inspired teachers and involved parents and communities.

www.c4k.org Computers 4 Kids—Whether you need a computer or want to donate a computer, this Web site is worth a visit.

www.scri.fsu.edu/~dennisl/CMS.html The Cyberspace Middle School is geared toward kids in grades 6-9, but parents and teachers are welcome as well.

Glossary

You probably see and hear lots of "tech terms" in the news, at work, and at your child's school. Want the low-down on what those high-falutin' words really mean? Here's a quick primer...

Applications see "Software."

Bandwidth refers to how much data can be transferred over your Internet connection in a specific amount of time. Think of bandwith as the "pipe" or "highway" that data travels on from one computer to another...the greater the bandwith, the faster your connection.

Browsers or **Web Browsers** are software programs that let you find, see, and hear material on the World Wide Web, including text, pictures, sound, and video. Netscape *Navigator* and Microsoft *Internet Explorer* are popular browsers.

A **CD-ROM** (Compact Disk Read Only Memory) is a computer disk that can store large amounts of information—much more than a floppy disk can. Everything from computer games to entire encyclopedias can be found on CD-ROMs.

The **Central Processing Unit**, or CPU, can be considered the "brains" of your computer. It consists of one or more circuit boards inside a computer that do most of your computer's work.

A **Chat Room** is a location on the Internet or Web that allows users anywhere to communicate almost instantaneously by typing, sending, and reading messages.

Domain Name see "URL."

To **Download** means to copy a file from one computer system to another.

E-mail (electronic mail) refers to a way of sending messages electronically from one computer to another, generally through a modem and telephone line that are connected to a computer.

Fiber Optics are little plastic or glass "threads" that use light to send digital information even more quickly than electrical wires or cables can.

A **Floppy Disk** is a small, plastic disk coated in a magnetic substance; it's used to store computer data.

Hardware is a term for the nuts, bolts, and wires of computer equipment. Central processing units, monitors, and modems are common pieces of hardware.

A **Home Page** is the starting point on a particular group or organization's World Wide Web site (which typically consists of multiple "pages").

A **Hypertext Link** is a way to connect a Web page to other pages that have related content. A link is usually underlined, and when you click on it you connect to the site without having to know or type its Web address (or URL).

HTML (Hypertext Mark-up Language) is a set of commands that tells a Web browser program how the Web page currently being viewed should look on your computer's screen.

The **Internet** is a worldwide network of computers people can use to gather and display information, and to communicate with one another. Using the World Wide Web is a popular way to explore the Internet.

Information Technology is the field of work and study that deals with processing and managing information and data using computers and related technology. It includes everything from Web design to computer programming.

Interactive Programs give you individualized results from your computer, depending on what information or action you enter into the program. Computer games and chat rooms are interactive programs.

Internet Service Provider (ISP) is a generic term for a company that connects you directly to the Internet through its server. You use an ISP to connect onto the Internet every time you log on.

The **Keyboard** refers to the part of the computer that resembles a typewriter. You use it to enter and change information.

A **Microprocessor** or **Microchip** is a small, integrated electronic circuit that can perform all the tasks of a central processing unit (CPU)—store information, do calculations, etc.

A **Modem** is a device that allows computers to transmit information to one another via an ordinary telephone line by changing digital (electronic) signals to telephone ("analog" or soundwave) signals and then back to digital signals.

A **Monitor** is the part of the computer that resembles a television screen; it's where you see your work.

A **Mouse** is a small device attached to the computer by a cord that lets you give your computer directions by moving a pointer around your computer screen.

Multimedia refers to programs that can combine text with pictures, sounds, and video. The World Wide Web is the multimedia version of the Internet.

A **Network** refers to two or more computers that are connected and can share information. Those in the same or nearby buildings are called *local area networks* or *intranets*; those that are farther away are called *wide area networks*. The Internet is a result of connecting networks all over the world.

Online Services are companies that offer members partial or full Internet/Web access. "Subscriber services" offer their members special services in addition to internet access.

Operating System see "Software."

Peripheral Devices refer to any part of a computer other than the central processing unit (CPU). Disks, keyboards, monitors, and printers are all peripheral devices.

A **Program** is a sequence of instructions that tells a computer how to perform a task or function. Also see "Software."

Search Engines are Web pages that make it easy for you to find things on the Internet by allowing you to search for information by typing in keywords or topic areas.

A **Server** is a powerful networked computer that can send and receive information to and from many different computers at once.

Software refers to a computer program or set of instructions. Operating system software operates the computer hardware itself and is invisible to you. Application software performs specific activities, such as word processing, games, Web pages, or spreadsheets.

Telecommunications is the science that deals with sending and receiving digital signals over large distances so people can communicate. Telecommunications includes everything from e-mail to digital cellular phones.

The **URL** (Uniform Resource Locator) refers to the address of a site on the Internet. Also called a domain name.

The **World Wide Web** (Web or WWW) is a hypertext-based network of Internet sites and browsers that provide multimedia, not just text. These pages have "www" at the front of their URLs (e.g., www.parentech.org). Most Internet sites these days are Web pages.

ParenTech is about...

The way we learn... **Technology + Education**

The way we work... **Technology + Careers**

The way we live... **Technology + Society**

ParenTech

Parenting in a Digital Age

A Partnership of Ameritech and NCREL

Ameritech

North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60523-1480

NCREL
North Central Regional Educational Laboratory
"Applying Research and Technology to Learning"

Technology and Careers

When I Grow Up...

ParenTech
Parenting in a Digital Age

Ameritech NCREL

A Partnership of Ameritech and NCREL

About ParenTech...

ParenTech is a unique technology information campaign that helps families "get a grip" on the technology that's all around us. A partnership of the nonprofit North Central Regional Educational Laboratory (NCREL) and Ameritech, ParenTech provides parents of middle schoolers (grades 6 to 8) with resources to help them understand the ways technology is changing how we learn, work, and live.

The ParenTech Resource Kit includes:

Three 16-page Parent Guides

An interactive CD-ROM

A Web site, available at www.parentech.org

ParenTech also reaches out to middle schools with an informative Teacher Guide, a principal's tip sheet, and a colorful poster. In addition, ParenTech connects with communities through a "mini-exhibit" and an outreach partnership with the American Library Association.

Whether you're a parent, a teacher, a principal, or just someone who cares about families, technology, and the future, we hope you find ParenTech's resources interesting and valuable. Read the guides, visit the Web site, explore the CD-ROM at your library or school... and most important, keep learning with your family and with your community. Enjoy!

Thanks to all the NCREL and Ameritech team members, external advisors, and others who have helped make ParenTech happen. To learn more about the team, visit ParenTech's Web site and click on "What Is ParenTech?"

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Avoid the "Working Blues"...

Help Your Middle Schooler Explore Future Careers Now!

Bet you wish that when you were a kid you could have had someone tell you what your future would *really* be like—a wise person who could share the secrets the next 20 years would hold and set your feet on the right path. (Of course, you might not have paid close attention to *all* those words back then, but still, you could have stored the unused nuggets away, ready to be retrieved when important decisions were looming.) Looking back, it would have saved a lot of headaches and sleepless nights if you had known how to get ready for the *real* future. No doubt, we all probably would have done some things differently.

So, How About Your Child?

Is there someone who can impart this life-changing, stress-reducing, headache-relieving information? How about...*you*? There's no reason you can't be that person. If you know about important career trends, you can help your child get a jump on his or her dreams. You can point him or her in the direction of discovering what 21st-century careers will be like. (An added bonus: These trends are pretty valuable for helping you in your career choices, too.)

It's *Not* Too Early!

You may think it's too early to think about your child's future career, but it's not. Even if his or her dreams are "all over the map," your child's budding interests make this the perfect time to begin investigating career ideas and options. Sue Swaim, executive director of the National Middle School Association, believes that "middle school is a time to discover, question, and experience a wide variety of different possibilities."

By the time your child graduates from high school, careers in technology will dominate almost every conceivable field. It's no exaggeration to say that middle schoolers need to start planning for careers in technology now. There are many concrete steps you can take, whether your youngster has a specific career goal in mind or is simply "shopping around." Research shows that it is your support, wisdom, and guidance that will have the greatest influence on the career your child eventually chooses. So the more you know, the better you can help your child...today *and* tomorrow!

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In Tomorrow's Workplace,

Not Even the Sky Is the Limit

It's hard to believe sometimes, but the fact is that today's technological innovations are so significant that our children will likely earn a living pursuing one or more careers that don't even exist yet! New discoveries are constantly leading to new job opportunities in every field imaginable. Qualifying for these jobs means that students should start to prepare now. They need to develop strong backgrounds in math and science and become skilled in understanding, reading, and writing about technology.

> "The Industrial Age has given way to the Information Age."
>
> *Price Pritchett*

One of the greatest gifts you can give your child is the understanding that the future belongs to the technologically prepared. A look at seven workplace trends will show you why!

Computers Accelerate and Improve Work

Computer technologies have dramatically changed the way even traditional workers get things done.

- "Remote control" surgery is just one of the cutting-edge innovations taking place in the medical field. Doctors also routinely work with MRIs, ultrasound machines, and CAT scans to get clear, multidimensional views inside a patient's body without surgery.
- Exploring for oil is now done on the screens of supercomputers.
- Lawyers and their assistants use giant computerized databases to research and prepare cases.
- Scientists are using GIS—Geographic Information Systems (computerized databases of multimedia maps)—to study the Brazilian rainforest. They can pinpoint the location of endangered species; take up-to-the-second air and water quality readings; create interactive, 3-D "maps"; and instantly send this data to other scientists all over the world.

Computer technologies have virtually redefined many jobs and created many new career fields. They also have led, directly or indirectly, to declines in fields such as manufacturing.

In car assembly plants, for instance, workers spend their time monitoring computers and robots that do the labor, and they often fix machines by debugging computer programs rather than wielding wrenches. It's predicted that by 2017, manufacturing jobs will comprise less than 10 percent of all jobs—as compared to 30 percent today!

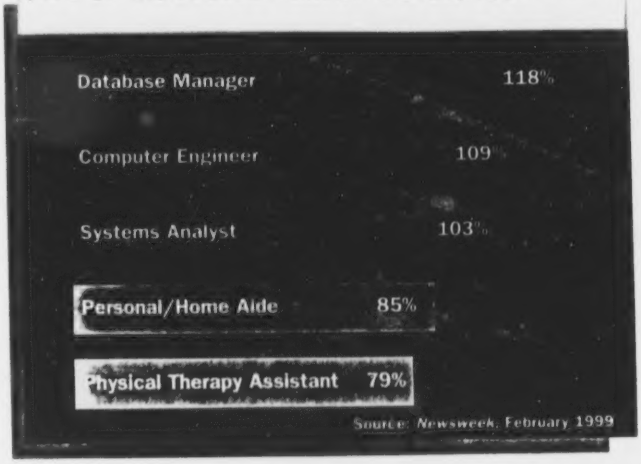
Information and Communication Are the New Commodities

Thanks to computers, networks, and Internet connections, information has become a universally available commodity. Careers that once focused solely on information *gathering* (for example, scientists) now focus on *using* information that technology makes instantly available. Tomorrow's workers will need to know how to apply information and use it to solve problems. And, they'll use technology to determine what information is needed next.

Instant Global Access

Thanks to innovations in technology, people all over the world are working as if there were no boundaries of time and space. American programmers routinely send digital information to coworkers in India so that projects can continue around the clock. American executives hold real-time videoconferences with Japanese clients. Students communicate with scientists in other states and

FIVE OF THE FASTEST GROWING JOBS, 1996-2006



Source: *Newsweek*, February 1999

By 2010, half of all Americans are expected to be self-employed—and many will "telecommute" to and from job assignments.

countries. Farmers monitor weather patterns and check global market prices on the Internet.

Individualized Hours

With the aid of computers, many job tasks can be done anywhere. Working from home but being connected to your office via computer (telecommuting) is likely to become more common. Workers will have more flexibility to balance home and work demands, and employers will save on overhead costs. Between 1991 and 1997, the percentage of workers with flexible schedules increased 85 percent, thanks to new technologies such as e-mail, faxes, videoconferencing, and easy Internet access.

Less Stability, More Opportunity

Today's middle schoolers may expect to change jobs seven to ten times throughout their careers. Several of those jobs are likely to be in different fields. Technology skills will smooth the transition. In addition, many of tomorrow's workers will be independent contractors, working part-time with more than one company. Tomorrow's workplace will need people who can combine specialized technological knowledge with the ability to adapt to new work circumstances.

Need for Continuing Education

In the past, most people's education ended when they got their diploma or degree. In tomorrow's world, if you stop learning, you'll stop earning. If employees want to keep their competitive edge in a world where information is the prevalent commodity, they will need to continually update their knowledge and technological skills.

Need for Career Management Skills

By 2010, half of all Americans are expected to be self-employed. Children will need to learn to be self-managers and be able to chart and direct their own career paths. Tomorrow's workers will need to constantly assess how they can use the next wave of technology to improve their futures. They'll need to keep developing new skills. Even specialists will need to apply old skills to new situations and will need to keep learning new technologies.

DID YOU KNOW?

"Information that workers need to have in order to perform their jobs routinely changes every six months in some businesses today."

Association for Educational Communications and Technology, 1997

Parent Action Goal:

Help your child gain an accurate picture of the 21st-century work world.

Give your child a broader view of the work world. People use technology in nearly every field. Help your child broaden his or her career interests by pointing out "behind the scenes" high tech jobs—for example, sound engineers for a youngster who wants to be a rap star!

Stay up to date. If you aren't sure what the latest high-tech jobs are, find out. Watch local and national news, read the help wanted ads, conduct research at the library. Once you have a better understanding of the opportunities out there, you'll be more comfortable talking about them with your child.

Be a 21st-century role model. Demonstrate to your child that you are committed to excellence on the job and in all aspects of your life. How? By continuing to sharpen your job skills and developing new ones. Give your child a positive outlook on working by maintaining a positive attitude about the technology you use in your job.

Check out...

The Kids & Jobs site has a special section called the Guide for Parents and Educators, which includes career guidance tools for parents of teenagers.

Get on the fast track to the 20 most wanted career fields with *U.S. News Online*'s College and Career Center.

America's Job Bank provides free services for job seekers and employers alike. Visit this site for job listings and job market tips.

New Careers: Making Sense of the Changing Workplace, by Michael B. Arthur, is a thought provoking book on workplace trends for the next century (Sage Press, 1999).

will take you to high tech want ads and advice for riding the "infotech wave" at work.

Why Middle Schoolers Aren't Thinking About High-Tech Careers

Girls, yes. Boys, yes. Clothes, yes. Grades, hopefully. All these subjects are right up there on a middle schooler's list of important things to think about (just like they were on ours). Careers in modeling or pro sports? Probably. Careers in high-tech...maybe not. So how come our "plugged-in" kids aren't thinking about high-tech jobs?

High-Tech Isn't on Their "Radar"

Many middle schoolers don't know much about today's high-tech careers for a simple reason: Their parents and teachers don't know much about them either. For example, an Illinois mom tells this story...

"My son came home from school one day with his mind made up to become a police officer. He had done poorly on his math exam and his rationale was that police officers don't need to know math. I wish I would have known then what I know now, because I would have told him that technology is used every day for law enforcement."

Your child may not realize it, but high-tech careers are all around you. Even professionals such as police officers use various forms of technology on the job every day. Help your child get a more realistic picture of the work world by pointing out that technology is used now in traditionally "low-tech" careers.

They May Not Think High-Tech Is "Cool"

If you take a survey of middle school students, chances are very high that they'll describe high-tech professionals as nerds who wear pocket protectors and bow ties. Even though today's kids spend a lot of time logged on to computers, they may not be able to get beyond this popular stereotype. The Information Technology Association of America cites this "image problem" as one of the main reasons there is a shortage of quality workers for high-tech jobs.

Minorities and Girls Are Often Left Out of the High-Tech Career "Loop"

The fastest growing fields of technology require strong math and science backgrounds. Yet young women and minority students—the fastest-growing groups of working Americans—are underrepresented in the high school and college courses that would prepare them for high-tech careers.

Why? Sometimes female and minority students receive subtly different messages about their abilities in math and science, and about the importance of these subjects in their futures. They may:

- Receive less encouragement from parents, teachers, and peers.
- Lack exposure to successful female or minority role models.
- Lack adequate career preparation information.

You open doors of possibility for your child when you encourage him or her to do well in math and science courses. You also can help by identifying women and minority role models who are "breaking out" to become high-tech superstars.

"But My Kid Just Isn't *Interested* in High-Tech Careers!"

It's okay if your child isn't explicitly interested in high-tech careers. As long as you support him or her in doing what he or she loves, you know you're doing a good job. Encourage your child to keep exploring and to prepare for many possibilities by staying involved in math and science. Help him or her be an enthusiastic learner about technology. And remember, most kids are interested in *some* aspect of technology—whether it's playing computer games, sending e-mail messages to friends and relatives, or even trading Beanie Babies® online. Use these real-life points of interest to broaden your child's horizons.

As a parent, what else can you do? Why not start by exploring these Web sites:

The Institute for Women in Trades, Technology and Science is dedicated to supporting women in high-tech careers by providing training and technical assistance.

The Minorities' Job Bank is dedicated to building a diverse workforce. It is an excellent Web site for minorities and women.

The Quality Education for Minorities Network puts special emphasis on learning about math, science, and engineering.

ASPIRA means "to aspire." This organization is devoted to the education and development of Puerto Rican and other Latino youth.

The American Indian Science and Engineering Society includes links to college guides and more.

What Employers Want

New Work Skills for the 21st Century

February 28, 2010
Wanted:
Responsible
Employees Who Can:
Communicate Well
Think Logically
Solve Problems and Generate Original Ideas
Take Action and Work Easily With Others
Use Today's Technology to Benefit Our Business
Reply Once
You're Qualified

A 1991 Harris poll asked parents, students, and employers whether high school grads were well prepared in reading, writing, and math. The results: 71 percent of parents and 63 percent of students said yes; but 79 percent of the employers said NO!

So what do employers want? The futuristic job ad says it all. Employers want workers who can read, write, and think intelligently...and who can use computers to work in groups, solve problems, and accomplish great things.

High-tech employers want even more. They want employees with "tech-plus" skills. These are people who have technology know-how and who *also* understand the needs of other fields.

"Job-seekers who possess technical skills in conjunction with a specialty area, such as business, are more marketable to today's employers," remarks Bob Litman of the U.S. Department of Labor. "As jobs change, it's harder to be skilled in only one narrow niche without becoming obsolete."

Employers want these employees today and they'll want them even more by 2010. The problem, many frustrated employers say, is that many schools aren't educating children in the "information age" skills they'll need to get jobs. When the time comes, will your child be qualified to answer that ad?

What Your Kids Should Know

In 1992, The U.S. Secretary's Commission on Achieving Necessary Skills (SCANS) put together a list of foundational skills that all students must have to be successful in tomorrow's work world. These skill requirements are the same whether your child will enroll in a four-year college, a two-year program, or a technical school, or enter the workforce right after high school.

Briefly, *all* students must have...

- ***Basic skills:*** know the fundamentals of reading, writing, math and science, and speaking and listening.
- ***Thinking skills:*** solve problems using those basic skills, think creatively, and know how to learn and reason.
- ***Personal qualities:*** work well with other people in an economy that is increasingly global; be responsible, sociable, and have personal integrity.

SCANS also identifies the following competencies for your child's success in a *high-tech* workplace. They must be able to...

- ***Select technology:*** determine which sets of procedures, tools, or machines, including computers and their programs, will get the job done.
- ***Apply technology:*** understand the proper procedures for setting up and operating machines, including computers and their programming systems.
- ***Maintain and troubleshoot technology:*** prevent, identifiy, or solve problems in machines, computers, and other technologies.

The SCANS report is available online at www.ttrc.doleta.gov/SCANS

Parent Action Goal:

Help your child connect today's academic skills with tomorrow's career skills.

Explore the essential skills in jobs your kid likes. Encourage your child to interview relatives or friends to learn what kinds of "school skills" they use on the job. Help him or her discover the importance of technical reading and writing, math, problem solving, and other skills as they relate to the real world.

Get your kid's feet wet. Investigate school activities, internships, camps, and volunteer activities where your child can use classroom skills in real-world, high-tech environments.

P.S. Don't forget about the personal skills. What electives is your child taking? Participating in classes such as theater, choir, or band can help develop speaking, reading, and listening skills—not to mention interpersonal skills such as teamwork.

Check it out...

Teaching the New Basic Skills: Principles for Educating Children to Thrive in a Changing Economy Richard J. Murnane and Frank Levy, The Free Press (1996).

www.megaskills[illegible]home[illegible]
Building achievement and life skills for both children and adults is the primary focus of The Home and School Institute. Visit this site for family activities and tips for parents.

www.ns[illegible] Check out this site for the latest research-based standards. The National Skill Standards Board develops voluntary skills standards for a highly skilled American workforce in the 21st century.

www.it[illegible] The Information Technology Association of America is developing standards for jobs and doing several projects with education.

www.vpskillsummit.[illegible] The Vice President's "21st Century Skills for 21st Century Jobs" is a national forum helping Americans get the skills they need to succeed and ensuring employers get the skilled workers they need to stay competitive.

High-Tech Jobs

What *Are* They, Anyway?

When today's middle school children enter the job market (around 2006) many of the most promising careers will be in technology fields. Without a doubt, your middle schooler needs to know what "techies" do!

"Techies." Just who are those people? If you guessed "Fans from the TV series *Star Trek*," you'd be wrong, but your confusion would be understandable. (Those soundalikes are called "Trekkies.") Admittedly though, techies do have something in common with the crew of the Starship Enterprise—they're also involved in exploration and they work with some pretty amazing technology.

But "techies" are the inventors and creators of the 21st century! They make the new technologies that change our world.

Technical specialists can be found in almost every career field imaginable, from business to medicine, to agriculture, to zoology, to the arts and entertainment. In one sense, everybody's job will be high-tech in the coming years. After all, we're all using technologies that weren't common in the work world just 20 or 30 years ago. No matter what field your child eventually chooses it's likely computers or other digital technologies will be used to get the work done.

The *most* high-tech careers out there are those where folks actually *create* the technologies we all use. These people design computers, develop software, devise ways to connect technologies, and adapt current technologies to new purposes.

Tomorrow's fastest growing job categories are in high-tech fields. The Bureau of Labor Statistics projects that between 1996 and 2006, the United States will require more than 1.3 million new workers to fill positions for computer programmers, systems analysts, computer scientists, and engineers.

SOME OF THE FASTEST GROWING HIGH-TECH CAREERS, BY LEVEL OF EDUCATION REQUIRED, ARE:

Doctoral degree	
Medical scientists	[illegible]
Biological scientists	[illegible]
Mathematicians	[illegible]
Bachelor's degree, work experience, or master's degree	
Engineers	[illegible]
Engineering, mathematics, natural science managers	[illegible]
Systems analysts	[illegible]
Computer engineers	[illegible]
Associate degree	
Paramedical	[illegible]
Paralegal	$33K
Vocational training	
Data processing	[illegible]
Equipment repair	[illegible]
Data entry	[illegible]

Adapted from: *U.S. News & World Report*. Mean annual salaries obtained from federal employment estimates.

What Some "Techies" Do

Computer Scientists are often researchers. They push the limits of what computers can do to come up with new discoveries that may one day have practical applications.

Computer Engineers design and test computer hardware, software, networks, and processes. They turn ideas and research into practical technology tools.

Computer Programmers use math-based programming languages to build computer software.

Systems Analysts design whole networks of computers that will do what an organization needs them to do, efficiently and effectively.

Does Your Child Have Any of These High-Tech Qualities?

There are all kinds of people in all kinds of high-tech jobs. "Techies" do, however, tend to share certain interests and abilities. They're:

- **Creative**...Develop new solutions for old problems. Come up with innovative and unusual ways to use technology. Are curious about why and how things could work.
- **Patient**...Don't expect to get things right on the first try. Learn from mistakes.
- **Analytical Thinkers**...Break down problems to figure out how people, and computers fit together. Use logical approaches to solve problems. Often enjoy puzzles, building or putting things together (and taking them apart) to figure out how things work!
- **Lifelong Learners**...Are not afraid to keep learning. Welcome new challenges and like to master new skills.

Think ahead. Imagine the future. Forecast the next trend and identify the next technology need. Anticipate potential problems and sidestep them before they happen.

- **Have an Eye for Detail...**Focus on the small details that make the difference between good technologies and great ones.
- **Blend Technology and Other Interests...**Apply technology to their other interests, whether it's music, the stock market, or publishing.

Sound anything like you or your middle schooler? If you answered yes, you're in good company. High-tech careers connect with lots of people's interests and abilities—yet many kids (and parents) don't know this!

When you encourage your kid to explore the high-tech aspects of interesting careers, you help keep his or her future open. It's a great way to help broaden your kid's horizons and tap into his or her natural interests.

THE TOP 10 JOBS 6TH GRADERS WANT:	SOME WAYS THESE FIELDS USE TECHNOLOGY:
Professional sports player	Sports medicine; equipment and shoe design; performance-measuring sensory equipment; digital cameras for sports broadcasters
Medical professional	Imaging and diagnostic equipment; genetic mapping; video- or Web-based health care at a distance; electron microscopes; "labs-on-a-chip"
Teacher	Instructional technology design (CD-ROMs, Web pages, educational software); distance learning; designing technology-supported curriculum
Entertainment	Sound producers and engineers; computer-based editing of film and TV footage; computer animation; computer-based music composition and Web-based advertising; special effects
Veterinarian	Databases to track animal health in zoos and the wild; microchips for tagging and lab analysis; computer interpretation of sounds and behavior
Scientist	Molecular engineering; genetic mapping; developing new materials; computer-based models of ecosystems and pollution effects
Lawyer	Online legal research; case management databases; "mock trials" using computers as virtual juries and judges based on past cases
Law enforcement	Databases that conduct worldwide searches for fugitives; espionage equipment design; diagnostic equipment for evidence and forensics
Computer field	Just about everything!
Writer	Remote reporting using telecommunications; writing for "new media" (Web pages, CD-ROMs); computer-run book and newspaper design

*Top 10 careers from Information Technologies of America Association's 1997 survey of nearly 400 sixth-grade students in eight schools in five states.

Parent Action Goal:

Help your child connect his or her skills and interests to interesting jobs.

Encourage your child to talk to a variety of people about their careers. Help your child investigate the most interesting aspects of jobs people really love. What do they find most interesting about their jobs? What do they enjoy most? Did a hobby lead them to their career choices? How did they choose their jobs?

A guidance counselor can help assess your child's interests and abilities. Guidance counselors have a lot of fun assessment activities that can help identify potential careers based on your child's interests. By scheduling a session with your school's guidance counselor you and your child can discover careers that could be a great match!

Help your child learn more about those "most-intriguing" careers. The library, the Internet, and your child's school are some of the best career-information resources around. Ask your librarian or media center specialist to help you find books, magazines, and "real career" Web sites.

Check out...

Learn about jobs for kids who like music, arts, math, science, P.E., social studies, and reading. Help your child identify jobs that match his or her academic interests.

Test Junkie provides you with a variety of career interest surveys plus personality and IQ tests.

Want to know how much a systems analyst makes? Or a computer programmer? Discover links and descriptions of over 200 salary surveys and summaries.

College and Continued Learning

Taking the Ultimate Road Trip to High-Tech Success

Do you have a special place at home or work where you pin up reminders of motivational messages? You know, one-liners such as "Anything worth doing is worth doing well " or "Just do it." You might want to consider making room for one or two more: "College is the best way to prepare for a high-tech career" and "Continuing education is the real key to career success."

The fact of the matter is that *all* 21st-century workers will be expected to expand their knowledge and sharpen their skills by continuing their education throughout their careers. That translates into "you and your child will need to keep learning for the rest of your lives."

Some popular means of continuing education include on-the-job training, seminars, workshops, college courses, and certification, among others. Your child may want to look into summer jobs, internships, or co-ops to connect his or her academic skills to the world of work.

> "College graduates now earn 76% more than those who don't go to college."
>
> *Secretary of Education Richard Riley*

It's vital that middle schoolers have an accurate picture of the educational paths they'll follow to reach high school, college, and ultimately, career success. The following statistics from the U.S. Department of Education demonstrate that they'll need your help to see the real picture. Fifty to 66 percent of eighth graders planned on completing college but...

- Only 25 percent planned on taking any college preparatory courses.
- Only 26 percent were learning the relationship between courses and career options.
- Only 49 percent were learning about the vocational courses offered in their high schools.

A bachelor's degree—often in a math- or science-related field—is one of the best ways to prepare for a high-tech career. Even students who major in nontechnical subjects will need to take some computer courses. A recent report by the National Research Council states that *all* undergraduate students, regardless of their major areas of study, should be required to take courses in science, math, engineering, or technology. Yet the American Electronics Association reports that the number of students graduating with high-tech degrees is falling!

Another path to consider is network certification—an alternative route to high-tech careers. It doesn't require a four-year degree. Certification can be obtained from major networking companies such as Microsoft or Novell. It demonstrates that the person understands how to manage the intricacies of computer networks. Over the next ten years, increasing numbers of colleges and technical institutes will offer certification courses. Today, some high schools even offer certification classes as part of their curricula!

DID YOU KNOW?

The following factors seem to improve students' odds of both going to and graduating from college:

- Having parents who expect that their children will go to college and who encourage their children to expect that, too.
- Having several friends in their peer group who also expect to go to college.
- Planning for college early, well in advance of filling out an application, by talking to college admissions officers and researching financial aid (often during sophomore year in high school).
- Taking challenging coursework. For example, students who take algebra and geometry in middle school are much more likely to go on to college than students who do not.

The Department of Education has identified the kinds of coursework that will prepare middle school students well for college or other advanced study:

- English
- Science
- History or geography
- Challenging math courses, starting with algebra and geometry in eighth or ninth grade
- Computer science courses
- Arts or music and a foreign language

High-tech middle schoolers should plan to take relevant high school courses.

IF YOUR KIDS ARE INTERESTED IN...	THEY MIGHT WANT TO TAKE CLASSES IN...
Pre-engineering (applied technology fields): *Robotics, Race Car Development*	Geometry, energy sciences, simple machines and mechanics, chemistry of machines
Computer programming: *Mutual Fund Tracking, Automobile Ignition Control*	Logic, Boolean algebra, algorithms, number theory, et theory, matrices
Networking technologies (building systems of connected computers): *Satellite Systems, Local Area Network/Wide Area Network*	Algebra, calculus, computer communications, optics, topology, "rate of flow" math problems
Electronics (analog and digital): *Personal Communication Systems, "Smart" Appliances*	Electricity, magnetism, heat transfer, trigonometry
Multimedia Web applications and database applications: *Webmaster, Programming, Computer Animation*	Statistics, algebra, classification of information, programming
Computer-assisted design (CAD): *Architecture, Fashion Design*	Topology, spatial relationships, visual thinking, circuits

Source: Information Technology Association of America [www.itaa.org]

Parent Action Goal:

Help your child begin to develop a plan for high school.

Sketch out a career plan with your child. Although it may seem too early, it's not; middle schoolers are ready to learn how to plan for their futures. Planning can start with a simple conversation about your child's dreams. Use this opportunity to help him or her think about the educational steps that lead to that "dream" career. Follow up with a trip to the library to check out books on career preparation.

Take a field trip. With your middle schooler, visit the high school he or she will attend. Check out the course options: What classes are available? What courses are required to graduate? Your child might want to talk with a guidance counselor and learn more about classes (including electives) and after-school activities.

Check out...

Think College Early provides you with useful resources to help you get your children on the right educational path to their future.

But What If I Don't Want to Go To College? A Guide to Success through Alternative Education, by Harlow G. Unger (Checkmark Books, 1998)

Microsoft Skills 2000 has an interest assessment game that matches your skills and interests to information technology jobs. Also, learn about certification opportunities and more.

This great site for students and adults provides monthly features on a variety of career options. Explore the articles written by career counselors and other experts.

Surf the Net with Kids Career Exploration Page.

That's a High-Tech Career?

Conversations with the "New Techies"

Phyllis Cullen, Nursing Informatics Researcher

A Registered Nurse and Ph.D. candidate, Phyllis believes that compassionate treatment and sophisticated technology can work hand in hand to improve patient care. She's working on her doctorate in the emerging field of nursing informatics.

Tell us about your work...
I start out by analyzing health patterns in patients' medical histories and from that information, I develop databases and programs to assist nurses. With technology, nurses have a reliable tool to anticipate the outcome of a patient's treatment. Informatics researchers are also studying the ethical and feasibility issues involved with using computer technology and information science in health care.

Nursing informatics bridges the gap between people exclusively involved in technology and people who are exclusively involved in health care.

Job preparation...
From a health care perspective, I've been involved in many aspects of nursing, from patient care to administration to teaching. I've always been interested in researching new developments, and that's where technology came in. I've never been afraid of new technology—my university background taught me the principles I needed to understand new technologies. I've taken many courses that relate to technology, including database systems, decision support, business modeling, and statistics for large data testing.

How to pursue a health care career...
First, keep your eyes open for new developments. Don't be afraid to jump into technological projects (e.g., at your school) even if you don't know much—you'll learn and you'll become someone others think of when there's a technological opportunity.

If you want to go into a particular field, demonstrate an interest in it! Don't be afraid of not knowing. Individuals who demonstrate that kind of enthusiasm seem to be plucked by organizations. Showing an enthusiastic interest will help you break into any field all the way up the ladder.

Pay attention to your talents. If you find it very easy to do something, and people around you find it not so easy, realize that you have a talent in that area. Look at what kinds of careers might correspond with that talent.

All students should learn the basic language of technology. Take courses in keyboarding and spreadsheets. Learn all you can about the Internet and the different ways that we can use technology to communicate and to give and get information. Learn about bits and bytes and chat rooms and all those little terms because when you can talk in the language of technology, people are more apt to share tips with you and will give you more information than you would otherwise get.

• • •

Rick Omanson, Ameritech Interactive Media Services

Rick's background in psychology has made him very marketable in the field of systems engineering. He's a firm believer in giving customers what they want.

Tell us about your work...
I manage a group of designers and programmers that are responsible for Ameritech's Internet products. The primary product we work on is an Internet service called Ameritech.net. This service offers the latest communications features to consumers and businesses, such as high-speed data access to the Internet, access to popular sites and services, and Web hosting—basically, any function of Web pages, plus more.

Job preparation...
Actually, I have a degree in child psychology. As an undergraduate, I didn't take a single course in computers or engineering—I was pursuing a career in child development research. But after graduation, I altered the track I was on and started working as a systems engineer. It was an easier transition than you may think. I analyzed what people wanted and then wrote detailed directions so a programmer could build it.

Systems engineering is similar to product design in that your job is not to build things, it's to describe what needs to be built. It's a nice entry into technology for people who don't have training in it. Eventually, I made a career move to Ameritech as a human factors engineer. I make Ameritech.net Web sites user-friendly for consumers and businesses who utilize this technology.

Skills required for your work...

There are many skills that have been essential to my success in the communications field, but the most important one is the knowledge of people. My background in psychology has provided me with a great deal of insight on hearing peoples' needs and working through the details to meet those needs. Working through the details means being able to work in a team environment, working alongside people with different strengths. It also means using my analytical skills and my artistic abilities.

How middle schoolers can use technology...

One of the functions of the Internet, in addition to getting information, is that it's a very social medium. I have a daughter who hated computers; she really detested them. But since she discovered instant messaging and e-mail, she's on it every single night. It has strengthened both her typing and her communications skills. Using the Internet as a communications vehicle among friends is a wonderful way for kids and parents to get exposed to it.

• • •

Adam Norton, 3-D Graphics/ Computer Animation

By combining his artistic skills and computer know-how, Adam has achieved success in the field of computer animation.

Tell us about your work...

I'm a computer animator for a company that produces the most popular arcade games and home video games on the market today. The team I work with consists of three animators and two computer programmers. The first step in our creative process is to determine the concept for a game. The most challenging part is creating a cutting-edge idea—going out on a limb to try something no one else has done before.

While I create the graphics and animation of the characters, another animator creates the special effects, and yet another creates the background scenery. The programmers then write the code that makes the computer perform the tasks we want. However, they have to keep within the limitations of the hardware. By working together as a team, we ensure that our individual endeavors merge together to make a seamless product.

How'd you get that job?

I feel lucky in the fact that I've always known what I wanted to do. Ever since I was a kid, I wanted to create cartoons. I was constantly drawing and making comic books. I was also interested in video games and computers, so it seemed only natural to merge my talent as an artist with computers.

My high school didn't have computers and when I got to college I felt like I was at a disadvantage. I was learning alongside people who had been working with computers for years. But, it didn't take me long to catch on. I worked hard and earned a dual degree in computer animation and multimedia.

Your formula for success...

To succeed in this field, you have to have the right combination of creative skills and computer know-how. I see a lot of great artists, but they can't create on the computer. On the other hand, there are people who know computers inside and out, but they can't do the artwork. Also, in this field there's no "on the job training." There's no one telling you what you need to learn this week or next week. You have to be self-motivated and stay on top of the latest technologies.

Advice for parents...

Parents should make sure their children are learning skills like problem solving, self-motivation, and how to work on a team. I can't stress teamwork enough. I've known people who get out of school and have done everything on their own. They resent working on a team and have problems sharing the credit for a finished product. In my line of work, a project turns out a lot better when we have seven or eight people working on it instead of just one. So it's important that kids start learning early on to work well with others.

Common Ground

Career Development Connects Families and Schools

By now you know a little more about the kind of work world your child will enter in the next century. So what's the next step? Help your child begin to answer the same questions you once asked (and maybe still do): What do I want to be when I grow up? And how do I get there?

Learning about careers is a fun, productive way for you to help your child focus his or her abundant interests on what is happening the adult world. Learning about careers can also be a neutral ground where your child can start to learn the rules and the structures of the "big leagues."

But all this doesn't mean that your child should be deciding in eighth grade what the rest of his or her life should hold. Just the opposite, in fact.

According to career development experts, middle schoolers should be *expanding* their horizons by *exploring* all kinds of jobs. They also should focus on doing well in school so that they have many educational options available to them in high school.

What Is "Career Development," Anyway?

A career isn't something that a person chooses in a day, a week, or a month.

Indeed, the process of exploring, selecting, and preparing for a career unfolds over years—and it starts earlier than you may think. Research (and probably your own experiences, too) confirms that most adults look for work that matches what they're interested in and what they're good at; the experiences they've had (in school and out); and the expectations their families have about what kinds of careers they might pursue. Experts call this lifelong process *career development.*

As a parent, you can help your child's career development by keeping in mind that in the middle school years, students should focus on career *exploration*. Specifically, they should:

- ***Assess their talents, abilities, and interests.*** Career development experts agree that it's best for young people to start exploring careers that match the things they naturally like to do and the things they're naturally good at.
- ***Develop a positive self-concept.*** When children feel good about who they are and what they can do, they hold high expectations for their futures and they're more motivated to try hard in school and in life. And their self-esteem rises when they see that the skills they're developing are valuable in the adult world.

  Kids need to check out a wide variety of careers, not just one field or specialty. This exploration can include anything from reading about careers to visiting actual workplaces. Career exploration helps middle schoolers get a broad, balanced picture of the work world before they narrow their choices.
- ***Understand the connection between academic skills and career skills.*** You know these are the years when your child starts questioning everything—"When will I ever use chemistry, anyway?" "How can I become the first astronaut on Mars?" When you help your child explore the skills and education that various careers require, you help answer these questions in fun, educational ways. These connections are particularly important because at this age many children begin to lose faith in their abilities to "do" technologically relevant subjects such as math and science. And students who narrow their educational paths may find their career choices are also seriously limited just a few years down the road.
- ***Set goals and start to formulate a plan for high school...and beyond.*** When kids are in middle school, they're ready and eager to take on new, "grownup" responsibilities (at least sometimes). It's the perfect time to start helping them plan ahead. Even if your child's plans change, you'll be helping him or her think in an orderly way about the future and take responsibility for making his or her dreams come true.

ABOUT THE FEDERAL SCHOOL-TO-WORK ACT

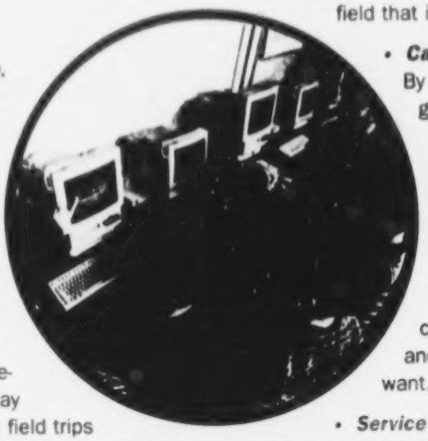
The 1994 School-to-Work Act provides federal funds to school districts that design formal career development programs. Programs are locally designed, but all federal School-to-Work programs must include:

- School-based learning activities that meet challenging educational and workplace skill standards.
- Work-based learning activities that give students on-the-job experiences.
- Connecting activities that bridge the gap between participating schools and businesses.

> "The road to success is always under construction."
>
> *Jim Miller*

Great Middle School Career Development Activities

Your child's middle school can provide many opportunities for high-tech career exploration. It's best if this exploration is a part of regular learning activities so that kids build their academic skills while they're exploring, and so they can see the connections between school and the jobs they like. Appropriate activities include:



- ***Classroom-based career exploration.*** Career exploration in the classroom can include specially designed units on careers in reading, math, social studies, or science; general information about careers that is integrated into everyday learning activities; field trips to workplaces that relate to subject areas; or interdisciplinary learning projects where student activities mimic the work of professionals in various fields.
- ***Career days, fairs, speakers, and field trips.*** Students can meet with educators, employers, employees, and/or human resource professionals to learn how to get the education and experience they will need.
- ***Mentoring activities.*** Formal programs can connect students with adults who act as role models and advocates for them during these important years. Mentors can also help your child explore careers that you may not be able to expose him or her to.
- ***Career exploration.*** Students get in-depth exposure to career options when they study careers in appealing fields, develop individual learning plans for high school, or investigate what jobs are available in their community.
- ***Job shadowing.*** Students get an up-close look at what a job is really like by spending a day on the job with someone in a field that interests them.
- ***Career counseling.*** By working with guidance counselors at the middle school or though community organizations, students can learn about the steps they can take to choose and get any job they want.
- ***Service learning and other community partnerships.*** Community-based learning activities give students the chance to do volunteer work that connects to classroom activities. Students get experience working with adults, build skills, and understand how they can use their skills to solve real-world problems.

Why Do *All* Kids Need Real-World Thinking Skills?

Leading business and educational organizations, as well as the U.S. Department of Education, recommend that schools give *all* students—not just those in vocational tracks—opportunities to connect classroom activities with the work world. By integrating career exploration concepts into the general curriculum, students can consider different careers as they relate to their own talents and interests.

Parent Action Goal:

Establish a 21st-century career exploration program at your child's middle school.

Check out your middle school's career exploration activities. Do students learn about how people in many jobs use computers? Do students learn about a variety of "cutting-edge" high-tech jobs (e.g., robotics, biotechnology, computer-aided design) as well as traditional jobs that are transformed by technology?

Push for parent/community involvement. Encourage your child's school to hold an open forum for parents and the community to discuss how to ensure career exploration activities for all students. Be sure to invite people in high-tech fields.

Volunteer. If *you're* in a high-tech field, volunteer your time and expertise to help young people explore jobs. You might arrange for work site visits or a speakers' series at your child's middle school, or you might help your child's teacher develop special classroom activities. You can also work with the principal to ask other local businesses to donate time and resources.

Learn more about your state's School-to-Work programs. The National School-to-Work Gateway Web site, at , provides links to sites across the nation and a wealth of information about promising practices and funding.

Kids and the Power of Work, KAPOW, is a program of the National Child Labor Committee, which helps schools create partnerships with community businesses to provide kids with work-related education and experiences.

Visit this site to learn more about programs that expect, value, and nurture a family and community role in children's learning.

Jobs for the Future provides research-based information about career development for the new economy. Learn strategies that will make a real impact.

Blazing the Trail

Leaders on the Path to 21st-Century Career Development

Great things are happening at Fredericktown Intermediate School in Fredericktown, Ohio. This small, rural school is receiving much-deserved praise for its career development program. Guidance counselor Kathie Brown gave ParenTech the lowdown. We also talked with parent Wendy Beutel, whose two teenage sons participated in the program.

When it comes to career development, the number one question parents have for Kathie is, "Why do students need to get involved at such a young age?"

Kathie: In grades 7, 8, and 9 we are simply doing exploration—self-exploration and exploration about the world of work. We don't encourage decision making at this young of an age and we teach the students that it's not wise to make big decisions based on one piece of information.

Wendy: When my sons started career education, my husband and I thought they were a little too young. But, in retrospect, I think it was a good time to do it. I believe parents can do more than they realize in terms of exploring different careers with their kids. And it helps the students when it comes time to decide what electives to take in high school. They begin to think about the courses they'll need to meet future requirements, whether it's for college, technical school, or another career path.

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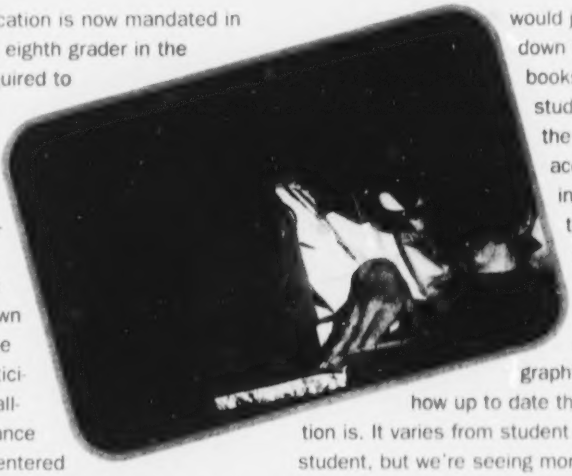

Career education is now mandated in Ohio. Every eighth grader in the state is required to have a career folder. Beginning their eighth-grade year, students at Fredericktown Intermediate School participate in small-group guidance sessions centered around the 14 career clusters named in the Coin Interest Inventory booklet. The clusters include careers in the fields of health, science and technology, education, manufacturing, and mechanics and repairs.

Students participate in activities that determine their personal interests, skills, and abilities, and their values as they relate to work. These activities include interest inventories; personality posters and collages; career family trees; a scavenger hunt to get signatures of adults who fit certain work characteristics; and general career research using books, magazines, and computers.

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Kathie: We definitely use technology to access information about careers. Many of our print resources have been replaced by CD-ROMs. The students prefer to use them and tend to do more exploring on the computer than they would just sitting down with books. The students love the quick access to information, and I think they really appreciate the graphics and how up to date the information is. It varies from student to student, but we're seeing more and more of them really enjoying doing their research and exploring on the computer.

Wendy: My youngest son really didn't have a clue as to what he wanted to do. Each week it was something different, which is typical of kids that age. By doing the interests surveys and other activities, he realized he was very interested in journalism.

He learned the skills that would be involved with that profession, such as good communication skills, creativity, and definitely computer skills. He even shadowed a writer for the local newspaper. Because of the career education process and his positive shadowing experience, he is still focused in that direction today.

Kathie: A favorite activity among the eighth graders is career shadowing. The small-group sessions prepare them by teaching them how to dress, how to

> "My son chose to shadow a systems analyst at a local computer company. It was a real eye-opening experience for him.".
>
> *Wendy Beutel, parent*
> *Fredericktown, OH*

greet people, the right questions to ask, and how to write thank you notes. Also, to learn more about the career they've chosen, the students do a one-page report before they embark on shadowing day.

Wendy: My oldest son knew from a very young age that he wanted to be a computer programmer, so he chose to shadow a systems analyst at a local computer company. I think it was a real eye-opening experience for him. He was able to see how important it is to work with others on a team and how sometimes the job involves just sitting down and figuring things out. This experience really confirmed for him that this is what he wants to do.

After shadowing day, the students prepare a presentation, including a speech and visuals based on their shadowing experience. According to Kathie, many of the students go all-out and dress up. It's a very elaborate occasion. Not only do the students learn about the career they chose to shadow, but those of their classmates as well. It has become a big tradition at Fredericktown Intermediate School and in some ways is a rite of passage for the students.

• • •

Kathie: Shadowing and interviewing are excellent career development tools. They can be huge motivators for kids in terms of academics. It's one thing for a parent or teacher to give their children information—sometimes it's in one ear and out the other. But when they hear it from a person in the world of work, it makes a huge impact. Especially when you get them to see the connection between school subjects they're taking now and how that knowledge will benefit them in the future. Through their shadowing experiences, the students are hearing over and over again how important it is to have skills in math, science, and computers.

• • •

Kathie tells this story of a student who came to see her...

"He was interested in a two-year technical program in law enforcement. He sat down with me and said, 'I want to make sure that when I start the program, I'll be really prepared.' We got out the catalog of the school he was considering and looked through all the different course work required. He was feeling pretty good about everything until we got to a course called forensic photography, which is where they go to the crime scene and take photographs. He said, 'Mrs. Brown, I've never owned a camera. I've never even taken a picture.' The next year he took a photography course offered through our art department. By making the connection between future requirements and actions he could take now to prepare, he took the initiative to enroll in that class and was motivated to do well."

KATHIE BROWN'S FAVORITE HIGH-TECH CAREER RESOURCES

Careers for Computer Buffs and Other Technological Types
by Marjorie Eberts and
Margaret Gisler
(VGM Career Horizons, 1993)

100 Best Careers for the 21st Century
by Shelly Field
(Arco, 1996)

Great Jobs for Kids Who Love Computers and
Great Jobs for Kids Who Love Communications Technology
(The Career Connections Series)

100 Jobs in Technology
by Lori Hawkins and
Betsy Dowling
(Macmillan General Reference, 1997)

Family Fun Page

...Just a Little More

Have you Heard About These High-Tech Fields?

Biomechanics—The study of the anatomical principles of movement. Biomechanical computer applications employ "stick modeling" to analyze the movement of athletes and race horses.

Biotechnology—The application of advanced computer sciences to design and make new medicines or industrial materials or to solve environmental problems, such as waste recycling.

CAD—Computer-Aided Design. A CAD system is a combination of hardware and software that engineers and architects use to design everything from furniture to airplanes. CAD systems allow the user to view a design from any angle with the push of a button and to zoom in or out for close-up and long-distance views.

Nanotechnology—A field of science whose goal is to use individual atoms and molecules as the building blocks of super-small computers. Nanotechnologists create computer chips and other devices that are thousands of times smaller than current technologies permit.

Distance Technology Telecommunications—The field concerned with moving digital information (words, sounds, pictures, data) over long distances. People who work in distance technology design everything from cellular phones to e-mail systems to satellite dishes.

Visit These Cool "Real Career" Web Sites...

Animals
http://www.netvet.wustl.edu/
The Electronic Zoo and Net Vet provide excellent information on animals and veterinary medicine.

Engineering
www.eweek.org/1999/students/
National Engineers Week has a site just for kids in grades 6-9 who are interested in all kinds of engineering—from robotics to agricultural.

Music
www.meetthecomposer.org/index2.htm
Meet The Composer strives to increase opportunities for composers.

Space Travel
www.hq.nasa.gov/office/codef/education/index.html
NASA's Web site has information for those interested in space exploration, including pages that are interactive.

Writing
www.realkids.com/club.shtml
Real Kids, Real Adventures is a site for kids who are interested in becoming writers. Visit this site and learn where to start.

Questions for Reflection...

Things my child likes to do (with technology and without)...

1. ______________________________

2. ______________________________

Careers where people do these kinds of things...

1. ______________________________

2. ______________________________

?

How we'll find out about the education these fields require...

1. ______________________________

2. ______________________________

Glossary

You probably see and hear lots of "tech terms" in the news, at work, and at your child's school. Want the low-down on what those high-falutin' words really mean? Here's a quick primer...

Applications see "Software."

Bandwidth refers to how much data can be transferred over your Internet connection in a specific amount of time. Think of bandwith as the "pipe" or "highway" that data travels on from one computer to another...the greater the bandwith, the faster your connection.

Browsers or **Web Browsers** are software programs that let you find, see, and hear material on the World Wide Web, including text, pictures, sound, and video. Netscape *Navigator* and Microsoft *Internet Explorer* are popular browsers.

A **CD-ROM** (Compact Disk Read Only Memory) is a computer disk that can store large amounts of information—much more than a floppy disk can. Everything from computer games to entire encyclopedias can be found on CD-ROMs.

The **Central Processing Unit**, or CPU, can be considered the "brains" of your computer. It consists of one or more circuit boards inside a computer that do most of your computer's work.

A **Chat Room** is a location on the Internet or Web that allows users anywhere to communicate almost instantaneously by typing, sending, and reading messages.

Domain Name see "URL."

To **Download** means to copy a file from one computer system to another.

E-mail (electronic mail) refers to a way of sending messages electronically from one computer to another, generally through a modem and telephone line that are connected to a computer.

Fiber Optics are little plastic or glass "threads" that use light to send digital information even more quickly than electrical wires or cables can.

A **Floppy Disk** is a small, plastic disk coated in a magnetic substance; it's used to store computer data.

Hardware is a term for the nuts, bolts, and wires of computer equipment. Central processing units, monitors, and modems are common pieces of hardware.

A **Home Page** is the starting point on a particular group or organization's World Wide Web site (which typically consists of multiple "pages").

A **Hypertext Link** is a way to connect a Web page to other pages that have related content. A link is usually underlined, and when you click on it you connect to the site without having to know or type its Web address (or URL).

HTML (Hypertext Mark-up Language) is a set of commands that tells a Web browser program how the Web page currently being viewed should look on your computer's screen.

The **Internet** is a worldwide network of computers people can use to gather and display information, and to communicate with one another. Using the World Wide Web is a popular way to explore the Internet.

Information Technology is the field of work and study that deals with processing and managing information and data using computers and related technology. It includes everything from Web design to computer programming.

Interactive Programs give you individualized results from your computer, depending on what information or action you enter into the program. Computer games and chat rooms are interactive programs.

Internet Service Provider (ISP) is a generic term for a company that connects you directly to the Internet through its server. You use an ISP to connect onto the Internet every time you log on.

The **Keyboard** refers to the part of the computer that resembles a typewriter. You use it to enter and change information.

A **Microprocessor** or **Microchip** is a small, integrated electronic circuit that can perform all the tasks of a central processing unit (CPU)—store information, do calculations, etc.

A **Modem** is a device that allows computers to transmit information to one another via an ordinary telephone line by changing digital (electronic) signals to telephone ("analog" or soundwave) signals and then back to digital signals.

A **Monitor** is the part of the computer that resembles a television screen; it's where you see your work.

A **Mouse** is a small device attached to the computer by a cord that lets you give your computer directions by moving a pointer around your computer screen.

Multimedia refers to programs that can combine text with pictures, sounds, and video. The World Wide Web is the multimedia version of the Internet.

A **Network** refers to two or more computers that are connected and can share information. Those in the same or nearby buildings are called *local area networks* or *intranets*; those that are farther away are called *wide area networks*. The Internet is a result of connecting networks all over the world.

Online Services are companies that offer members partial or full Internet/Web access. "Subscriber services" offer their members special services in addition to internet access.

Operating System see "Software."

Peripheral Devices refer to any part of a computer other than the central processing unit (CPU). Disks, keyboards, monitors, and printers are all peripheral devices.

A **Program** is a sequence of instructions that tells a computer how to perform a task or function. Also see "Software."

Search Engines are Web pages that make it easy for you to find things on the Internet by allowing you to search for information by typing in keywords or topic areas.

A **Server** is a powerful networked computer that can send and receive information to and from many different computers at once.

Software refers to a computer program or set of instructions. Operating system software operates the computer hardware itself and is invisible to you. Application software performs specific activities, such as word processing, games, Web pages, or spreadsheets.

Telecommunications is the science that deals with sending and receiving digital signals over large distances so people can communicate. Telecommunications includes everything from e-mail to digital cellular phones.

The **URL** (Uniform Resource Locator) refers to the address of a site on the Internet. Also called a domain name.

The **World Wide Web** (Web or WWW) is a hypertext-based network of Internet sites and browsers that provide multimedia, not just text. These pages have "www" at the front of their URLs (e.g., www.parentech.org). Most Internet sites these days are Web pages.

ParenTech is about...

The way we learn... Technology + Education

The way we work... Technology + Careers

The way we live... Technology + Society

ParenTech
Parenting in a Digital Age

A Partnership of Ameritech and NCREL

Ameritech

North Central Regional Educational Laboratory
1900 Spring Road, Suite 300
Oak Brook, IL 60523-1480

NCREL
North Central Regional Educational Laboratory
"Applying Research and Technology to Learning"

Technology and Society

Fast Forward to the Future

ParenTech
Parenting in a Digital Age

A Partnership of Ameritech and NCREL

About ParenTech...

ParenTech is a unique technology information campaign that helps families "get a grip" on the technology that's all around us. A partnership of the nonprofit North Central Regional Educational Laboratory (NCREL) and Ameritech, ParenTech provides parents of middle schoolers (grades 6 to 8) with resources to help them understand the ways technology is changing how we learn, work, and live.

The ParenTech Resource Kit Includes:

Three 16-page Parent Guides

An interactive CD-ROM

A Web site, available at www.parentech.org

ParenTech also reaches out to middle schools with an informative Teacher Guide, a principal's tip sheet, and a colorful poster. In addition, ParenTech connects with communities through a "mini-exhibit" and an outreach partnership with the American Library Association.

Whether you're a parent, a teacher, a principal, or just someone who cares about families, technology, and the future, we hope you find ParenTech's resources interesting and valuable. Read the guides, visit the Web site, explore the CD-ROM at your library or school... and most important, keep learning with your family and with your community. Enjoy!

Thanks to all the NCREL and Ameritech team members, external advisors, and others who have helped make ParenTech happen. To learn more about the team, visit ParenTech's Web site and click on "What Is ParenTech?"

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I’s 1999...

Do *You* Know What Your Child's **Future** Will Be Like?

From the moment your child first came into your life, you've had hopes and dreams for his or her future. Your mind is constantly on fast-forward: What will the future hold? How can you get your child ready?

But when you think about technology in your child's future, what do you see?

Whether you're an optimist or a pessimist about it, there's no question that digital technologies—the microprocessors, home computers, and telecommunications that connect our lives—are driving forces in today's society. Technology isn't the only force changing our lives, but it's one of the most pervasive.

It can be hard to keep up with the world of technology, especially with new innovations developing every three months. You might even think that it would be easier to discuss the birds and bees with kids than it would be to explain all the new technplogies around you!

You're probably hopeful *and* skeptical about what new technologies mean for our children's future. Will they be "cybergeniuses," absorbing more information in a week than their parents did in a lifetime and using it to create amazing new worlds? Or will they become point-and-click zombies, their social skills and creativity zapped by the computer?

And for parents, perhaps the biggest technology question of all: What can you do to guarantee your child will realize his or her full potential in a digital world?

The truth is, you *can* face the future head on and you *can* prepare your child for the coming decades. How?

It's more important to know how technologies shape our world than it is to know how every last gizmo works. Now and tomorrow, you'll be able to focus your attention on those technological innovations that are most important to your family and your child's future.

From the diverse opportunities and challenges that technology offers, we will all choose our futures. The more you know, the better able you'll be to help your child choose wisely. Then, the future will be theirs—and yours!

Inside the Guide

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Bits, Bytes, "Boom"

What *Is* Digital Technology?

First, let's take a closer look at what we mean by the word "technology." In the most general sense of the word, a technology can be almost any human-made device that people use to accomplish something they need or want to do. Technologies are simply *tools*—so a hammer, a book, an automobile, a pencil, and a computer are all technologies!

However, for almost all of us, "technology" has a much more complex set of meanings. The 1988 book *Information Anxiety* makes the interesting observation that most people use the word "technology" to refer only to tools that have come into existence during their lifetimes. What's important about the things we view as "technological" is that they usually require some kind of *change* in how we're used to living our lives.

Almost all the technologies that have people thinking and changing these days are forms of *digital technology*. Digital technology is the basis for all the computers and computer-related tools that are so much a part of life in our times.

All digital technologies use *binary code* at their most basic level to store and manipulate information. Binary code is a simple language composed only of combinations of the numbers one and zero to store, manipulate, and transmit information.

A single "0" or a single "1" in a binary code is called a *bit*, and one *byte* is composed of 8 bits (for example, the number "00101100"). Digital technologies can reduce *any* kind of information to this form—pictures, sound, numbers, words, or processes for manipulating information.

Millions of bytes of digital code can be stored on *microprocessors* or *microchips* made of inexpensive silicon and wire that are tiny and lightweight enough to place in almost any object—making digital just the right technology for running objects large and small, simple and complex. Microchips are used to store digital information in everything from high-powered computers in major research laboratories to your clock radio.

"Today, there are over 15 billion microchips in use—the equivalent of two powerful computers for every man, woman, and child on the planet."

Michael Malone, One Digital Day

Digital information can also travel from one location to another over computer cable, telephone lines, or fiber optic cable, or it can be beamed to and from satellites. When it finally reaches us, a series of programs in the machine that receives the information usually translates the binary code into pictures, sounds, words, or numbers.

Most of the time the digital aspect of something we use is invisible to us (or "transparent" in the lingo of technology designers); we only experience the end result of the technology. Yet if you were to pull back the surface of almost every machine you encounter—from streetlights to heart-lung machines—you would see digital technologies hard at work.

Why Has Digital Technology Become So Important?

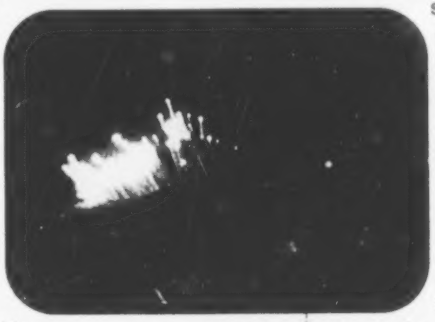
Basically, because it's the fastest, most powerful, and most flexible way to store, manipulate, and transmit information developed to date.

One of the astounding aspects of digital technology is its versatility. If you want to change the function of a digital machine, you don't always have to build a new one—you can often simply *reprogram* the one you have to do something new. In addition, a computer's *memory* allows it to operate itself once it's been programmed. In the words of writer Michael Malone in the book *One Digital Day*, microprocessors are a "meta-invention"—an invention that has spurred the creation of thousands of *other* inventions.

An (Incomplete) History of Digital Technology

Your kids probably have a hard time imagining a world without computers. Yet home computers are only the latest evolution in a digital story that began back in the 1940s and '50s. Here are just a few highlights:

1940s and '50s: A scientist at MIT invents binary code in 1942. The first computers that use binary code—mammoth "mainframe" machines the size of football fields that store digital code in thousands of meticulously ordered file cabinets full of punch-cards—are built by the military to survey the sky for enemy planes.



1960s: The development of the microchip makes it possible for giant mainframes to become smaller, more portable, and less expensive. At this point, digital information and digital systems become very popular among engineers and other kinds of designers. As a result, almost every field begins to look toward computer technology to determine how it could serve them.

Meanwhile, the Internet is in its infancy. Research centers and universities begin experimenting with the idea of connecting computers to allow several users in different locations to share large amounts of data and sophisticated computer programs. In 1969, ARPANET—a network of four computers and about 20 scientist users—starts up.

1970s and '80s: Spurred by the advancements of programmers and enthusiasts who had begun designing computer programs for games, writing, and accounting, the first personal computers (known as "minicomputers") break into the consumer market. The Apple II and Radio Shack TRS-80 hit the stores in 1977.

In 1982, the first standardized Internet protocol is released, providing one common language for all computers in the rapidly expanding network.

However, using this network still requires knowledge of arcane programming languages, and users can only share plain text with each other (no pictures, sound, or graphics). So programmers set to work designing an interface that will allow non-programmers to use the network and send and receive sounds, images, and even moving pictures. In 1989, this interface—the World Wide Web—is launched.

1990s: The advent of the parallel processor (a microchip that can manage multiple functions at once) brings unprecedented speed and power into home computing. More power on a single microchip means computers get smaller and lighter and portable laptop computers become popular.

The establishment of the World Wide Web and Web "browsers" (using languages like Java and HTML) that allow your home computer to access multimedia Web sites spurs an explosion of Internet use.

At the start of the '90s, there are about 100,000 sites connected to the Internet worldwide. In 1993, there are 1 million. And as of 1999, there are nearly *40 million.*

Parent Action Goal:

Learn more about new technologies.

Keep your eyes and ears open It's not hard to learn about digital technologies; just keep your eyes and ears open! Use the TV, radio, newspapers, or magazines in your home or at the local library. You might want to try *Popular Mechanics, Omni, Discover,* "Circuits" (the *New York Times'* technology section), or *Red Herring* magazines, or your local paper's science and technology pages.

Remember to use community resources You don't have to go far to actually see and even use new technologies; museums, libraries, and community centers offer opportunities to check out the latest digital gadgets. Don't forget the educational value of window-shopping, too; you can learn about technology by visiting computer-related stores even if you never make a purchase!

Let your child teach you Kids often take the lead in using new technologies by trying them out at school, at the library or community center, or at a friend's house. At this age, your children are probably eager to show you what they can do with technology...and you'll probably be surprised at what they know!

Check out...

The parent's Guide to the Internet (published by the U.S. Department of Education) is an excellent manual for families who want to learn about one of society's most important technologies. Available online at **www.ed.gov/pubs/**

The Public Broadcasting System's technology pages offer a wealth of information on the stories, people, and timeline behind digital technologies. Available at **www.pbs.org / technology.**

To see all kinds of technologies in action, try the books **One Digital Day** and **24 Hours In Cyberspace** (Times Books, 1998). They offer 24-hour photo journeys around the world to see how the microchip is changing our lives.

How Stuff Works is a fun place to learn all about just that—from circuits to modems. Available at **www.howstuffworks. com**

9 Digital Trends

For the 21st Century

What will the technology in your child's life look like in the next 20 years? While it seems that hundreds of technology innovations spill forth every day, there are several major trends that underlie most of the developments that are shaping tomorrow.

Infotech Everywhere: According to most major future forecasts, information technology fields—computer hardware, software, communications, and information services—are leading the technology innovations that will change our society.

Graham Molitor, editor of the *Encyclopedia of the Future*, writes that "monumental investments are being made to develop and enhance the information superhighways. In the United States, a total of between $100 billion and $500 billion is being committed over the next several years to extend and upgrade competing information handling modes." In fact, it's expected that by 2008, 80 percent of people in developed countries will have access to some sort of "information superhighway."

Convergence: If you've heard of Web TV, then you're familiar with an example of convergence. Convergence means that technologies that traditionally use different kinds of electronic signals (computers, TV, radio, and phone lines) will all work off of a digital signal and thus can be combined into multipurpose, interactive machines. Experts predict that in just six years (by 2005) many home and office technologies will converge to provide users with seamless multimedia experiences—without jumping from one technology to another. Twenty-five years from now your children's children may not even think of the Internet as a kind of technology, as Web technologies are integrated into almost every machine we have.

Portability: One of the biggest trends in digital technology is the rise of portable digital computers that are integrated into equipment that goes everywhere we go, in cases that may be no larger than your hand. Forecasters predict that beginning around 2010, materials that are stronger, lighter weight, and even more durable will replace the silicon and metal in microchips, allowing high-powered machines to become even smaller. Researchers are currently working on calculator-sized computers and even computers that can be worn as eyeglasses (with voice-recognition software and video projections onto the glasses' lenses).

Things Get "Un-PC": When we think of technology, most of us think "personal computer"—that box in the corner (or laptop case) that stores programs and provides us with connections to digitally based information. However, the biggest boom in consumer technology isn't in PCs at all, but in appliances that have some of the most desirable aspects of PCs—e-mail capability, Internet access, or specific programs—without the entire programming structure of a personal computer.

Digital cameras, "smart" pagers, global positioning systems—these are the technologies that will take digital information and power out of the PC and into virtually everyone's life in the next century.

Bandwidth, Bandwidth, Bandwidth: Think of bandwidth as the plumbing of distance technologies —wiring constitutes the "pipe" that all digital information travels through to get from one place to another. The bigger the "pipe," the more digital information can flow from one place to another.

Adequate bandwidth is the major factor in ensuring two-way voice, video, and data transmission that provides Web browsing that's as quick as changing TV channels, or full-motion audio and video-on-demand that looks and sounds good. As communications companies continue to upgrade their infrastructure—whether it's cable, telephone wiring, or fiber optics networks—more of us will have access to ever-broadening bandwidth in our homes and offices.

A Wireless World: It's estimated that by 2010, satellite feeds will become the most widespread form of digital information transmission, since satellites don't depend on "hardwiring" (wires between two places), but can bounce information back and forth from satellites in orbit around the earth. This means you will be able to access e-mail, two-way video, or your hometown news station's broadcast from a portable device anywhere in the world without relying on cables or wires. Many people may use broadband wiring in their homes and offices, and satellite feeds when they're "on the road" with portable technologies.

> "New developments in technology change the course of people's lives, their behaviors, and their attitudes to the world."
>
> *Coates, Mahaffie, and Hines, 2025*

Standardized Digital Protocol: It's the complaint of many frustrated computer users: Why can't different technologies "talk" to each other? Spurred by market demand, many digital programs are becoming more compatible. Nowhere is this truer than with computer programming languages.

Most technology developers and programmers are heading toward a single digital protocol (a set of rules that will allow all kinds of technologies to read each other's languages and communicate information easily). By the year 2006, most communications systems in industrialized countries will adopt a standard digital protocol.

Faster, More Powerful: In the '60s, Gordon Moore, the founder of Intel, predicted that the power of the microprocessor would double every 18 months. Over the last 30 years, he's been right—and his once-outlandish prediction is now known as Moore's Law. The power of microchips made of new materials is expected to be 100 times more than current chips, giving new technologies the ability to process a lot of information simultaneously. In computer terms, this kind of processing is known as parallel processing or "neural networking" because it closely mimics the way the human brain works.

HIGH-TECH TV AND RADIO

CNET Central, The New Edge, The Web, and Cool Tech: A block of news and special reports on technology. SCI-FI Channel, Saturdays and Sundays, starting at 9 a.m. EST; and USA Network, Sundays, starting at 6 a.m. EST. **www.cnet.com/Tv/**

CNN's Science & Technology Week: The latest news on digital developments. CNN, Saturdays, 1:30 p.m. EST. **www.cnn.com/CNN/Programs/Science**

www.realaudio.com: Listen to radio from around the world using free RealAudio Web software.

Less Expensive: In 1962, a low-powered prototype of the personal computer cost $20,000. Today, computers that are much more powerful are available for less than $1,000, and microprocessors are in $10 watches. While cutting-edge systems can still be pricey, many consumer technologies are expected to continue becoming more affordable to more of the population, simply because more and more people want the convenience and choice that digital technologies can provide in a fast-paced world.

This market demand has driven the development of cheap and powerful chips that can run operating systems in almost every kind of device as well as expanded and improved communications connections to homes and offices through wiring and satellites.

These are a few of the most important digital trends for the new millennium. But how might digital developments change our daily lives? And what will your children need to know to be successful in the future?

On the following pages, we look at some "possible tomorrows"—and the skills your child will need to succeed.

Action

Understand your "digital kids."

Get visual;multitask. Today's middle schoolers are not only part of the millenial "baby boom" (born between 1979-94, they're nearly 60 million strong); they also think differently because of technology. They tend to understand images and spatial relationships better and they're more comfortable doing several tasks at once. These skills are likely to be important in the next century. How are *your* visual and multitasking skills?

See the big picture. Kids tend to learn technology skills easily because they don't worry too much about their computer's nuts and bolts. Instead, they focus on the task behind the tech, and they learn mechanical skills almost "by accident." Take a lesson from your kids and remember the big picture while you're learning.

Encourage "hard fun." Researcher Jane Healy says that computers are more beneficial to kids after age 9 because they can use them in more "grown-up" ways. And in middle school, kids are hungry for activities that stretch their minds. Recognize when your child learns to do new and challenging things with the computer—not just the same old tasks.

Check out...

Read Don Tapscott's columns in *FamilyPC* magazine, especially "The new media family: Use your kids' computer knowledge to help forge a better relationship." Available at **www.zdnet.com/family pc/content/9805/columns/parental.html**

MaMaMedia's Web site shares information about the generation they refer to as the "Clickerati"—how today's kids think and learn differently because of technology. Available at **www.mamamedia.com**

Failure to Connect: How Computers Affect Our Children's Minds—For Better and Worse (Simon & Schuster, 1998) is a thought-provoking book by Jane Healy about how technology can help and hinder kids' development. Also try *Childrens' Journeys Through the Information Age*, by Sandra L. Calvert (McGraw Hill Text, 1998).

BEST COPY AVAILABLE

"What If?"...

Some Possible Tomorrows

Wouldn't it be great to have a crystal ball and see exactly what the next 30 years of your child's life will be like? Well, that's one technology that hasn't been perfected yet. But lots of other innovations are on the brink of coming true that will make your child's adult life pretty amazing. And you can learn about many of them now!

Futurists, computer scientists, and other experts have been extremely busy trying to forecast what the next century will bring. From their predictions, we've assembled the following "possible tomorrows" (and estimated times of arrival) to help you imagine what the future may bring.

Home Life: *The World at Your Kitchen Table*

2002: *Entertainment on demand* becomes common. Through convergent technologies like "Web TV" and digital satellite transmissions, you'll be able to order up almost any movie or TV show any time, right from a TV-top box! See www.smarthomes.com.

2005: *"E-living" becomes a way of life.* You've already heard about the boom in "e-shopping" on the Web. A recent ZDNet survey revealed that more than 20 million Americans consider their Internet access "indespensible"—a number that's bound to grow as people use low-cost, high-bandwidth Internet services to go to school, work, bank, and do errands...even visit with friends and family. See my.yahoo.com. You'll be able to order up *customized clothes*, mixing and matching your favorite colors, styles, and fabrics—without spending a fortune! The secret: computer-run manufacturing that can automatically, quickly assemble custom clothes from Web orders.

Your middle schooler graduates from high school. Congratulations, parent! The teen years are (almost) over!

2008: *Personal digital assistants* (also known as computer "genies" or "avatars") will be commonly used. These portable high-powered computers may respond to your verbal commands to schedule appointments, scan your surroundings to keep you safe, or compile a personalized news broadcast from satellite transmissions.

"Genies" may use *intelligent software* to understand a wide range of human speech, learn from experience, and reprogram themselves to adapt.

2009: *"Virtual reality" eyeglasses* may give you a new outlook on life, combining microchips with specially tinted lenses. Such glasses may allow you to join interactive role-playing games with people all around the world whenever you pop them on! See www.virtual-reality.com/vr.html.

2011: *Composite materials* that are designed using digital engineering tools will be used for new construction. A form of carbon known as *buckminsterfullerine*, or "Buckyballs"—a super-pure carbon steel—will be adapted to create stronger, more flexible bridges, skyscrapers, almost anything. Computer chips themselves will use carbon-based components instead of the silicon and metal chips that are currently used.

2012: The first truly reliable *language translation computers* will appear on the market.

2016: Helpful *robot servants* may make your household feel like something out of *The Jetsons*. Or, instead of Rosie the Robot, your home may have "digital cockroaches" that scurry around sweeping up dust from corners and ceilings. See www.androidworld.com.

2016: *3-D holophones* will require massive bandwidth more than anything else. With life-size projections of

FAR OUT!

2027: How about **shape-shifting furniture?** It may someday be possible! The science of **nanotechnology** is about shrinking computers down to atom size—even building them out of individual molecules—so they can do amazing things.

In theory, billions of nanocomputers could be built right into regular objects and then programmed to rearrange the object's atomic structure on command, actually turning a blue table into a yellow one or even into a chair! But although the concept is based on science, so far it's still just a cool idea.

To learn more, visit **www.foresight.org**

> **1977:** "There is no reason for any individual to have a computer in their home."
>
> *Ken Olsen, president/founder of Digital Equipment Corp.*

friends or coworkers moving around the room, "reach out and touch someone" takes on a whole new meaning!

2018: *Your child is in his or her 30s.* Are you a grandparent? Retired? Planning a space shuttle trip?

Getting Around: *Technology Will Move You*

2007: Thanks to broadband, videophones, and videoconferencing, much *business travel will become virtual.*

2009: *Intelligent vehicle highway systems (IVHS)* may someday squeeze more capacity out of existing limited-access roads.

2010: *Fuel-cell powered cars* that use photons and advanced digital sensors will appear on the market.

2019: *High-speed railroads* that use magnets to levitate cars above the tracks *("maglev" trains)* could link major cities.

Superfast planes may go into orbit—just like the space shuttle—to get people across the world in a few hours.

2020: *Computer-managed vehicles* will bring about a different kind of daily commute, as we leave the driving to self-driving cars. Yet telecommuting over the "Information Superhighway" will also mean fewer people on the roads! Your car will be safer, with clutches and brakes that might be partially made of *molasses-like liquid metal chains* that could become more or less rigid depending on what computer sensors direct it to do.

2025: Biotechnology may bring about *self-cleaning ships* with microorganisms that eat barnacles right off the side of the boat! Complex submersible robots could make remote underwater inspections of ships' structures.

Transportation of goods, from food to furniture may literally "go underground" with *subterranean tubing systems.* These networks could be inspected and repaired by remote robots and managed by embedded microchips! Consequently, our surface roads may last longer, traffic would probably be reduced, and streets could become cleaner and quieter.

2029: A *manned mission to Mars* will probably begin shortly after a *permanent moon base* is established. Interestingly, space travel (the "final frontier")—the way many Americans first became aware of technology—is harder to forecast since it is a massive, expensive undertaking. Space travel and exploration—even staffed outposts for living and experimentation—all demand years of planning and many millions of dollars for even one trip.

DON'T MISS. . .

The Encyclopedia of the Future, edited by George Thomas Kurian and Graham T.T. Molitor. (Macmillan Library Reference, 1996). The result of a five-year mission to explore future worlds from almost every angle, this two-volume set collects hundreds of predictions from every imaginable field.

Parent Action Goal:

Become a family of futurists.

Put on your long-range vision.

Think ahead ten, twenty years from now. What do your children think the future will hold? What excites them? What makes them anxious? Help them identify the digital technologies that they think will be important when they're adults.

Reality test your assumptions.

Explore what others think the future will hold. Are experts' predictions similar or different from your family's? Is there a topic your family wants to explore further?

Get inventive. Looking into the future takes creativity. Science fiction is one way to explore possible technologies; imagining technologies you'd like to create is another. Visit museums and libraries to learn about past machines and the things people tried to invent (sometimes successfully, sometimes not). Explore how inventors have looked at technologies—and life—a little differently.

Check out...

Reality Check (1996), from the editors of *Wired* magazine, is a fun book of year-by-year predictions of future thinkers from across many fields. (Parent Advisory Note: A few of the forecasts touch on adult subject matter.)

Other interesting books include *Probable Tomorrows*, by Marvin Cetron and Owen Davies (St. Martins Press, 1997), and *The Next Twenty Years of Your Life: A Personal Guide into the Year 2017*, by Richard Worzel (Stoddart Press, 1997).

The World Future Society is dedicated to futurists and future studies of all kinds. Visit them online at **www.wfs.org** or pick up a copy of *The Futurist*, the Society's monthly magazine. Also check out the Institute for the Future at **www. Iftf.org or** the daVinci Institute at **www.davinvi-institute.com**

Take a look inside MIT's Media Lab, a think-tank of technologists and futurists who are making some of tomorrow's cutting-edge technology. Available online at **www.media.mit.edu.**

"What If?"...

continued

Staying Healthy:
Computers That Know What Humans Are Made Of

The ability to use computers to map genes of chemicals, plants, animals, even ourselves—and then to manipulate them—will be *the* major medical development of the 21st century.

2001-2003: After decades of research, the *Human Genome Mapping Project* will be completed. This project (the attempt to draw a map of all the genomes that make up the human genetic code) may be the biggest step yet in eradicating inherited diseases. See www.ornl.gov/hgmis for more.

> "The first decade of the 21st century will be one of the most remarkable and productive in the history of medicine."
>
> *Cetron & Davies,* Possible Tomorrows

High-speed computers have made the Human Genome Mapping Project feasible. There are so many millions of genomes (pieces of DNA information that compose a single human gene) that only incredibly fast calculations and computer-based modeling systems can make it possible to isolate and test the functions of various genome combinations.

2007: *Expert computer systems* may come into routine use as surrogate doctors, lawyers, and other professionals. Computerized self-care will help people monitor their own health as never before. People will make more health decisions on their own. Already "telehealth" services help people in remote areas or those who are housebound "visit" with doctors and nurses and get lab results to the hospital. See www.telemedmag.com.

2008: *New plants and animals* will be developed through genetic engineering. Some of these new species of plants may be "*hyperaccumulators*," plants that can help clean up soils polluted by heavy metals such as lead and cadmium.

Billions of tiny machines copied from *the photosynthetic organs of plants* could scavenge excess carbon dioxide from the air of a greenhouse-heated planet and "metabolize" it into free carbon, oxygen, and synthetic petroleum.

2012: *Pesticides and chemical fertilizers will have declined* to less than half of current usage due to technologies that allow scientists and farmers to genetically engineer hardier plants.

2013: *Gene therapy* will emerge from genetics research. Tiny *nanocomputers* may be able to interfere chemically with faulty genes. See www.gene.com/ae/AB/.

2015: *Organic or alternative farming methods* will become more widespread and the majority of farmers will use these methods.

HOW DO PEOPLE FORECAST THE FUTURE?

The urge to predict the future is part of human nature. People have been doing it from their front porches or around boardroom tables for many years. But some people are specialists at it, they're called "futurists."

Futurists use a combination of scientific methods and imagination to forecast what the next 20 to 2,000 years will be like. They gather and analyze information from the fields of history, psychology, anthropology, economics, and other areas to build "scenarios" or descriptions of what the future may be like.

According to researchers in George Washington University's Forecast of Emerging Technologies, "forecasts of the next 5 to 10 years are often so predictable that they fall into the realm of market research, while those more than 30 or 40 years away are mostly speculation."

But no forecast is perfect. Why do many fail? Often, it's not because people have gone too far with their predictions, but because they haven't gone far enough. Most people don't try to look beyond the current, accepted uses of the technologies around them.

Futurists note that this would be as if the inventors of the engine thought only of using it to make horse-drawn carriages go faster. In fact, it took "out of the box" thinkers to imagine using the engine for innovations like motorcycles and jet planes!

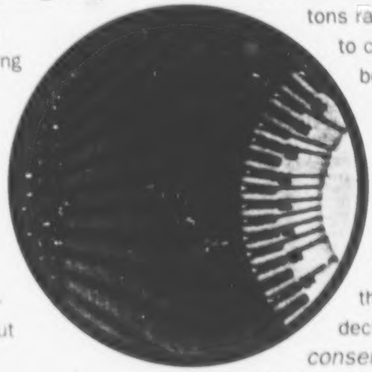
1949: "Computers in the future may have only 1,000 vacuum tubes and weigh perhaps 1.5 tons."

Popular Mechanics

2018: It is likely that scientists will be able to grow genetically similar or *cloned organs.*

2026: *Virus-size machines* will tinker with the DNA of a single human cell, while slightly larger machines will float through the bloodstream to chisel cholesterol from the walls of plaque-clogged arteries.

Citizenship: *Make a Difference Digitally*



2005: *Internet voting* becomes common among industrialized nations. Because voting tallies can be compiled more quickly, and because people can send their votes from anywhere, elections may become more frequent and voter turnout may rise.

2010: *Computer-based decision making and futures modeling* will become a common tool for policymakers. Some such "expert systems" are already in use today. They're high-powered computers that contain databases of many decisions, experts' analyses, and statistical programs that weigh various factors of a problem. They're used in some aspects of medicine and law already.

2012: *MEMs, or tiny digital sensors* (like the ones used in today's airbags) may be used to design supersensitive lie-detector tests and tracking systems for prisoners on parole. See http://csmt.jpl.nasa.gov/csmtpages/index.html.

2014: Faster-than-ever *biochips and optical computers* that use photons rather than electrons to code information will begin to simulate the way the human brain works in sensory recognition and thought processing.

2021-2030: Nations may find their relative influence declining. *Worldwide consensus will be needed* for progress on complex, controversial problems of population, sustainability, space development, and human bioengineering. As a result, closer international relations and cooperation will be necessary to accomplish global goals and needs.

NO WAY!

2050: Will intelligent computers eventually learn how to evolve and replicate themselves—a "survival of the digital fittest"? Some computer scientists think it's only a matter of time until "learning computers" program themselves to adapt to their environments. Imagine waking up in the morning to find your home computer has built an additional computer overnight!

Parent Action Goal:

Get the access you want.

Priorize your access needs.

Internet, e-mail, word-processing or database programs, and art or multimedia presentation programs will be the basis of many future technologies. But you don't need access to all of them at once. Do you want to use a computer mostly for writing, for educational games, or for Web browsing? Start by getting access to the technology you want to use *most*.

Consider buying a computer.

It's getting easier all the time to buy computers (some new computers are available for $700; and used computers sell for even less). Check out computer magazines and consumer guides before making your purchase. Here are a few "bare minimums" if you're purchasing computer hardware on a really tight budget:

At least 32 megabytes (MG) of random-access memory (RAM)

A processor that runs at a speed of 300 megahertz (MHz) or higher

A hard drive of 2, preferably 4, gigabytes (GB) or more

A modem of 28.8 or 56.6 kilobits per second (Kbps) or more

Find free access

Check your library, community center, college, or work training center for free Internet access. Find out if there's a lab with computers, what kinds of applications are available there, and if you can attend training sessions. Other ideas include sharing a computer and Internet/e-mail account with a friend or neighbor, or "renting" computer time at a 24-hour copy center.

Check out…

FamilyPC on the Web has reviews of software and hardware, along with articles on family computing. Available at **www.zdnet.com/familypc/**

Cybergrrl: Getting Online for Free or Cheap has information on minimizing your Internet access costs, including info on free Internet access services (or "freenets"). Available at **www.cyberg.rrl.com**

The Freeware Home Page provides access to many free, downloadable software applications. Available at **www.freewarehome.com.**

Don Believ t e Hype?

Technology Raises Some Tough Questions

Self-cleaning houses, intelligent software, gene therapy…so far, this millenium stuff sounds great. But what about the not-so-great stuff? The cloning debate, Internet credit-card thieves, that evil computer hacker on last night's "X-Files"?

There's no doubt that digital devices *have* made life easier, more productive, and more interesting for most of us. Yet you don't need to be a professional futurist to know that new technologies can bring problems as well as progress.

The good news is that you can help your child tackle tough technology issues, now and in the future. The trick is to know the hazards. Below, we highlight seven of the top technology challenges for the next 30 years.

The Rules for Staying Private and Safe Will Change. With so many digital technologies compiling information about our habits, our privacy may become harder to protect. On the other hand, cyberspace is a profoundly anonymous place, as anyone who's logged onto a chat room with a fake name can attest.

Both circumstances could create problems. Our lawmakers might struggle to enforce laws to keep digital files and searches confidential. Or people might have their online identities "stolen" by computer criminals.

We'll Be More Interdependent. As more and more systems are becoming "digitally intertwined," a breakdown in one machine could mean a meltdown for many. Sophisticated computer viruses or programming glitches may make us more vulnerable to losing information and services we rely on.

"CYBER SAFETY" IS IMPORTANT

SOME TIPS TO HELP YOUR CHILD STAY SAFE ONLINE

- **Treat the Internet like a real place.** Your youngster is starting to go places and do things independently. The Internet is just another of those places. It's reasonable for you to know "where" your child is going online and "who" he or she is hanging out with—even if you're not there yourself.
- **Keep your computer "public."** Don't put computers in isolated rooms, where kids may not have you around to guide them. Try high-traffic rooms instead.
- **Set clear privacy rules.** Every family's rules are different. You may require that you know your child's computer password. Or you may decide to visit the sites your child visited by using your Web browser's "history" function. Whatever you decide, be sure everyone knows the rules before logging on.
- **Emphasize good manners.** Talk with your child about good taste and consideration for others when they create Web pages or e-mail messages. Also encourage your child to talk with you if they're concerned about something a friend is doing online.
- **Road-test content blocking software.** If you have content-blocking software on your computer, regularly try "forbidden" search items to make sure it's working.
- **Remind your child not to share identifying information**—such as last name, address, telephone number, school name, or credit card information—without your permission.
- **Help your child set boundaries.** Tell children not to respond to online messages that make them uncomfortable, and to come to you or an adult they trust if they see something online that concerns them. Also remind them never to meet someone they've met online unless they have permission and go with a trusted adult.

To learn more, visit:

The Parents' Guide to the Information Superhighway, published by the Children's Partnership, at www.childrenspartnership.org

The American Library Association's *America Links Up! Project* at www.ala.org

The National Center for Missing and Exploited Children's cybersafety resources at www.missingkids.com

> "The future will offer more opportunity and less security. Virtually every trend I see verifies this."
>
> *Richard Worzel,* The Next 20 Years of Your Life

We'll Face More Moral and Ethical Choices. Technology gives us more information and more control than ever before, which means we'll need to make more decisions about to how to use our new abilities.

Many ethical decisions will occur on the health front. For example, biotechnology may enable doctors to alter a baby's genes before it is born or even afterwards. But should they? These issues, and many others, will continue to be controversial. The next century will require thoughtful decisions about technology's ethical dimensions every day.

It Will Be Harder to Separate What's "Real" From What's Not. Wider access to virtual reality technology could make it hard for most of us to figure out if a digital news report is real or just the fiction of a clever computer artist.

In addition, as more people use technology to filter the information they get, many people may receive unbalanced information about the world around them. It will be important for your children to determine who's creating the information that comes into their life, judge its reliability, and seek multiple perspectives.

We'll Keep Speeding Up. Nearly everyone these days feels at least some strain trying to keep up with the pace that technology sets. In just a few short years, our society has gone from expecting letters to be delivered within a few weeks (traditional mail) to overnight (FedEx) to same-day (fax) to almost instantly (e-mail). Emerging high-speed technologies will continue this trend. Technology's "any time, any where" benefits will be abundant. But this fast, information-heavy lifestyle can be stressful, too.

We'll Work Harder to Balance the Social Vs. the Solo. As technology brings more resources into the home (for work or play), people will continue to spend less face-to-face time with each other. Yet humans are still social beings; it's hard to know what we gain and what we lose when more of our relationships become virtual. Your kids may need to work harder to ensure they spend enough time with "real" people.

There Will *Always* Be Unexpected Consequences. It would be nice to be able to predict every change that every new technologies will bring into our lives. But for better or worse, life isn't that way. New technologies always bring changes we can't anticipate.

For example, when the radio was first invented, most people thought it would be used just like the telegraph had been: to send and receive urgent information between two parties. But it wasn't long before radio had become a totally different, mass-media resource—and totally transformed our society.

Science fiction and science fact *are* sometimes eerily similar. As we learn from the past, we get better at forecasting the possible benefits and problems of the future. Yet 21st-century citizens will still need to look out for the unexpected uses and unforeseen results of each new technological development.

Parent Action Goal:

Balance your family's "technology diet."

Place the computer in a family area —like the kitchen or den—so you'll be there to guide your child's activity without being intrusive.

Set time limits. Many experts recommend limiting online time to one hour a day. Treat computer time like TV time—if children's behavior or grades don't live up to expectations, they might lose the privilege. Adults should also limit their use of computers or cell phones during family time.

Take a "technology sabbatica." Set aside one tech-free day a week when you turn off the Nintendo and computer and turn on to other activities. This can give your family a chance to slow down and explore other enjoyable activities.

Prevent "digital isolation."

Use your eyes and ears. Watch how your kids behave when using a computer. It's a good guide to how their computer use is affecting them. Are they talkative and happy? Or have their eyes glazed over?

Try it their way Try out your children's video games, Web sites, and other online favorites to get a perspective on what they like about computer time. Ask for your children's opinions, too. They're old enough to talk about whether *they* think a "shoot-em-up" video game affects their thoughts and behavior.

Check out...

TechnoStress: Coping with Technology @Work @Home @Play, by Michelle M. Weil and Larry D. Rosen (John Wiley & Sons, 1997), is a practical guide to finding balance in a high-tech world.

NCRTEC's "Year 2000 Bug" Resources page has a brief overview of the Y2K problem and links to resources and tools to help you deal with it. Available at **www.ncrtec.org/capacity/y2k/**

Lifelong Learning Skills

For the 21st Century

Right about now the question, "So what am I supposed to *do* about all this?" is likely to be racing through your mind. After all, you can't teach your child to use computer programs that haven't even been *invented* yet!

The good news, say many futurists, is that you don't need to. What we need, they say, are lifelong learning skills.

"Lifelong learning." You've probably heard that phrase before. It sounds catchy, but what does it *really* mean? On the simplest level, it means that in order for your child to be successful in this ever-changing, high-tech world, he or she can't stop learning—ever.

Yet lifelong learning skills aren't new skills or ones that only a "chosen few" can understand. In fact, you may be surprised to learn that these skills at their most basic level aren't "technology skills" at all. Why? Because technologies are changing so fast and there is no "one-size-fits-all" body of technology knowledge.

To help get you started, here's an overview of 21st-century, lifelong learning skills.

The first skill is **information literacy**. To master this skill, your child will need to know how to:

- *Find information using many resources*
  There's a lot of information out there and many different places to find it. Lifelong learners search in books, CD-ROMs, databases, videos, the Internet, and one very valuable resource—other people. They know the importance of using a variety of resources.
- *Assess, analyze, and interpret information*
  Lifelong learners know they need to rely on more than just their gut feelings to help them make good decisions. New technologies may help them quickly gather huge amounts of data, but *they* determine which information is most important. Then they ask themselves, What does this information really mean? How will I use it to make this decision? Are the sources accurate?
- *Understand information presented in numbers*
  These learners aren't Einsteins; they're just good at interpreting numbers—an increasingly important skill in a statistic-heavy age. Whether they're using pocket calculators or number-crunching computers, they are comfortable using technology to obtain data and statistics.
- *See behind the "techno-hype" to decide if information is valid*
  Informed learners are like detectives, carefully examining each source to figure out whether the information is accurate. They don't get sidetracked by slick words or fancy graphics. And they recognize when information is one-sided or misleading.

The second skill has to do with something we deal with every day—**problem solving**. You'll need to teach your child to:

- *Identify and analyze problems*
  With technologies changing virtually every-day, good problem solvers have to think "outside the box." Once they identify a problem, they can take it apart to figure out the various pieces and solutions.
- *Make decisions based on sound reasoning, relevant data, and ethical principles*
  New technologies provide many benefits; however, when a problem arises, it's often one that nobody has ever had to solve before. Good problem solvers examine an issue carefully from all angles, asking themselves, Do I have enough information? Is this the right decision to make?

Skill three, **collaboration**, requires that your child can:

- *Work well with a variety of people who have different views, opinions, and styles*
  Technology is truly making our world a "global village." People who are good collaborators respect and welcome different opinions, backgrounds, beliefs, learning styles, and working styles of others. They determine the strengths and talents of each team member. They also help others use technology to shore up weaknesses and work together over time and distance.

Skill four, **good communication**, means that your child needs to be "fluent" in three communication styles to get their message across:

- *Written*
  Good writers organize their thoughts clearly and are concise in presenting their ideas, whether writing a letter on a word processor or sending an e-mail message.
- *Verbal*
  Good speakers talk clearly to others, whether it's in person or through some form of technology, such as distance learning or videoconferencing.

- *Visual*
  Good communicators use technology to create presentations, Web pages, and 3-D simulations to make their messages visually appealing and to help get complex points across.

The fifth skill is **self-directed learning**—being responsible for yourself. Your lifelong learner should be learning to:

> “In a time of drastic change, it is the learners who will inherit the future.”
>
> *Eric Hoffer*

- *Prioritize what they want to learn*
  Good learners know in order to get anything accomplished, they have to look at their tasks and goals to identify what they need to learn now. With all the advances in technology, trying to learn too many new skills at once can make your child a jack of all trades, but a master of none.
- *Take initiative for learning new things*
  Distance learning, online courses, and interactive technologies give us more control than ever over what we can learn. Self-directed learners don't wait for a teacher or boss to tell them what they need to know.
- *Organize multiple tasks*
  Self-directed learners are good at organizing tasks, projects, and information to avoid becoming overwhelmed. They may use calendar software or hand-held digital organizers to keep track of their appointments and deadlines. They use technology to make the most of the time they have, wherever they are.
- *Use the best learning style for different circumstances*
  Self-directed learners recognize how and when they learn best. For example, two students decide to learn about robots. They each choose a technology designed to meet their individual learning needs. One of the students may use a CD-ROM while the other student learns by watching a video or e-mailing questions to a robotics engineer.
- *Assess whether they've met their goals*
  These learners can assess how well they've learned something and whether or not they need to do more exploring. They ask themselves, Did I meet my goals? What should I do better next time?

The sixth skill your child needs to learn in this rapidly changing world is **adaptability.** The smart learner knows that you have to keep trying new things. Adaptable learners should be:

- *Willing to try new technologies and learning experiences*
  Like the Boy Scouts, adaptable learners like to "be prepared." They keep an eye on the future so that they're ready when new technologies or learning experiences come along. They're always asking, How can this help me? How will it change my life? What's next?
- *Persistent*
  Persistent learners take after *The Little Engine That Could.* When they try to learn a new skill or information, they don't stop when they meet with failure. They are patient when learning new technologies and realize that practice makes perfect.
- *Flexible, creative and open-minded thinkers*
  Adaptable learners always want to know "How?" and "What if?" They have a great sense of curiosity that encourages them to examine things from many angles and not just the ones that seem most obvious. They like to think ahead and imagine what new technologies could be just around the corner.

Parent Action Goal:

Become a family of lifelong learners.

Your child is most likely to learn how to be a lifelong learner by watching you. Take stock of your own lifelong learning skills: Are you "learning how to learn" with technology? Make a conscious commitment to become a 21st-century lifelong learner.

It's a great way to make family fun time lifelong learning time! Your kids may decide they want to learn exactly how a computer keyboard works, or they may want to build a Web page. Find a topic, set a timeframe, and start doing "detective work" to find libraries, museums, or activities that will help you reach your goals.

Did you know that more than 70 percent of everything people learn, they learn outside of school? Whether your children love or hate school right now, you can help them understand that they *are* successful learners when you ask them to reflect on what they've learned each day.

"Continuous Learning" is a brief online course for adults who want to become lifelong learners—but it would be fun for middle schoolers, too! It includes fun quizzes and activities to help you identify your preferred learning style and develop a personal learning plan. Available at

A series of five booklets for parents about lifelong learning from kindergarten through high school is available from the Northwest Regional Educational Laboratory. Read more about the series online at

Educator and technologist Seymour Papert's book *The Connected Family* is a great guide for parents who want to help their kids use technology to become lifelong learners. Also check out the Connected Family Web site at

Fast Forward . . .

Parents and Futurists Talk About What Works

Fascinated by computers? Baffled by fuel cells? Captivated by CAT scans and MRIs? Nervous about cloning experiments? According to Bill Halal, a futurist at George Washington University, "You haven't seen anything yet. This is just the beginning of what is to come."

No doubt about it. It's a different world out there than it was when we grew up. Whether you find that exciting or unnerving may depend upon how your family "gets a grip" on the technology in our lives.

When Chicagoan Greg Paraschos was in high school, computers were just being considered. Indiana resident Maria Pimentel-Gannon remembers taking computer programming in college. Now both are parents of middle schoolers who perceive technology (whether it's a cordless phone, TV, or a computer) as a way of life. Greg's kids can't imagine life without it. "They seem to think that we were raised in the stone age," laughs Greg. His two middle schoolers (one boy, one girl) are just getting into computers while Maria's daughters have been using them for some time now.

But no matter what the level of their kids' computer expertise, these parents recognize the importance of technology in their children's lives and their need to support that learning. "I don't think there is any question that the most important thing to do is to learn how to use computers," remarks futurist Graham Molitor. "That is so critical for being able to cope in the information-dominated environment that our youngsters are going to be looking at in the years ahead."

One thing parents probably shouldn't do is worry too much about how comfortable their kids will be with computers. The kids certainly don't worry. "The kids I see all take to computers like fish to water," says Halal. "Most kids now have access to computers and understand and use the Internet. You don't have to do much to get them to adapt to that. Just provide them the equipment and they pick it up from their friends and courses in their schools. They thrive on it."

That doesn't mean that kids don't need their parents when it comes to computers. On the contrary, there are extra steps only parents can take to start preparing their children for a high-tech future.

Step 1:
Use Technology to Connect

When the Pimentel-Gannons team up to use the computer, they get to discover more about their common interests. "We all love to learn, and we spend a lot of time sharing knowledge with each other." What Maria's doing when she works with her daughters on the computer is modeling collaboration. And modeling is one of the most effective parenting strategies you can use—with or without technology!

Greg Paraschos notes,"Even when our family's just playing computer games, I try to show my kids I recognize how well they're learning to use technology." Gene Roth, professor of education at Northern Illinois University, thinks it's vitally important for parents to do things that help their kids recognize that they are capable learners in and out of school. An expert on lifelong learning, Gene feels that often "we tend to overlook all of the times people learn in family, in community, in church, at play, and at work. Parents can help their children broaden their concepts of themselves as learners so that they realize that they are already successful learners."

Finally, if *you're* feeling daunted by computers, Halal suggests it can be helpful to connect with other parents who also want to learn about technology.

Step 2:
Hands-On Opportunities Help

The Paraschos's don't have a computer at home, but that doesn't stop them from giving their kids opportunities for hands-on learning. According to Greg's wife, Theresa, the kids are the first ones out the door when she heads to the library. While she looks for books, they head straight for the computers. Greg remembers, "My parents always told me, 'If you can read and write, you can do anything.' Today maybe it's, 'You can do anything if you can read, write, and use a computer.'"

"Knowledge increases when shared."

Bill Halal, futurist

The younger Paraschos's don't mind going to work with Theresa on Saturdays. They know they can use her computer to log onto the Internet while she's working. And the Paraschos's are mindful of how important it is to take advantage of learning opportunities where the whole family can participate. They regularly take their kids to museums, the zoo, forest preserves, and the aquarium.

Step 3:
Talk About Ethical Issues

Is science fiction becoming non-fiction? As advances in technology take place worldwide, today's parents have to confront issues their parents never even imagined. For a lot of families, this means spending time exploring the kinds of ethical and spiritual dimensions the future may hold. Technology has brought about many unexpected changes: cloning, "designer babies," and life support for ill patients.

Maria uses topics her daughters are interested in to discuss important issues. "We've talked a lot about the movie *Armageddon*," remarks Maria. "We talk about those kinds of movies from a spiritual point of view. We've also discussed cloning and whether or not mankind should have the capabilities of determining which human beings will live." At the Paraschos's house, both Theresa and Greg talk with their children about "the darker side" of the Internet—safety issues, mostly.

Step 4:
Start With What's Most Interesting *to You*

It's a lifelong learning fact: people learn best when they're learning things that are directly relevant to their lives. So, start by learning about future technologies that are most interesting to your family. Don't force yourself to learn every new technology just because someone else tells you it's important or you'll get overwhelmed.

Greg and Theresa's family is interested in outer space, so they look for educational television programs about space travel and visit museums that have exhibits on the space program. On the other hand, Maria says her daughters are "very artistic—they love to create beautiful greeting cards and poetry with the computer, so we do that most often when the girls aren't using the computer for homework."

As these parents have found, it may be a different world out there, but that doesn't make it something to fear. If we're prepared and willing to keep learning, we can look forward to successful and fulfilling lives.

Not convinced yet? Well, if you're not sure you want to take our word for it, take futurist Bill Halal's instead: "There are no limits to what you can do today....Anybody can gain access to knowledge that they need to accomplish whatever they want.... The limits are only the ones in your imagination, skills, and personal commitment. It is important that kids understand that, literally, they can achieve their dreams."

FIVE WAYS TECHNOLOGY CAN HELP YOUR FAMILY GET CLOSER

Information—You can learn a lot about parenting, the teen years, and education through Web sites, educational CD-ROMs (available at computer and book stores), and through e-mail listservs on parenting. (Visit www.topica.com's comprehensive index of e-mail listservs).

[illegible]—Technology can help busy families connect with each other via e-mail, voice mail, pagers, or Web pages, especially if extended families live at a distance or some members of the family work odd hours.

[illegible]—Computers can be one of your common interests, where you and your child learn together, and a tool you can each use in ways that are relevant to you.

[illegible]—Simply spending time in front of the computer together, shopping for a computer, or discussing what you've found online provides you and your child with valuable time together, which is particularly important during the middle school years.

Fast Forward—Using and talking about technology with your child is a good starting point for discussing the future: What do they want to do? How does technology fit into their dreams? What do they need to learn or experience to make those dreams come true?

Family Fun Page

…Just a Little More

47% of today's teens are going online. While they're there, 83% use e-mail; 51% play games; 38% have their own Web pages.

Newsweek *magazine, May 10, 1999*

Questions for Reflection…

Our family's visions for using technology to learn over the next few years…

1. ______________________________
2. ______________________________
3. ______________________________

Our "family rules" for using technology safely and intelligently…

1. ______________________________
2. ______________________________
3. ______________________________

How we will get access to technologies that interest us …

1. ______________________________
2. ______________________________
3. ______________________________

Our favorite Web sites (this week!)…

1. ______________________________
2. ______________________________
3. ______________________________

Fun, Fascinating Web sites…

www.yahoo.com
Maintains an extensive **"Millenium" Index** with tons of sites on the year 2000 and the future in general.

www.thinkquest.org
Think Quest is an international educational initiative for kids ages 12-19. Think Quest challenges kids to create innovative, educational Web sites.

http://members.xoom.com/Gadzillion/Think.htm
You think you have enough on your mind already? Well, **A Gadzillion Things to Think About** really gives you something to ponder. This Web site features over 5,000 questions on topics such as technology, health, sports, and more than 100 others.

www.ala.org
Great Sites lists hundreds of kid-friendly sites selected by the American Library Association.

www.techtales.com
Technology can be just for laughs! Visit this site to read "the funniest tech support stories on the Internet."

Glossary

You probably see and hear lots of "tech terms" in the news, at work, and at your child's school. Want the low-down on what those high-falutin' words really mean? Here's a quick primer ...

Applications see "Software."

Bandwidth refers to how much data can be transferred over your Internet connection in a specific amount of time. Think of bandwith as the "pipe" or "highway" that data travels on from one computer to another...the greater the bandwith, the faster your connection.

Browsers or **Web Browsers** are software programs that let you find, see, and hear material on the World Wide Web, including text, pictures, sound, and video. Netscape *Navigator* and Microsoft *Internet Explorer* are popular browsers.

A **CD-ROM** (Compact Disk Read Only Memory) is a computer disk that can store large amounts of information—much more than a floppy disk can. Everything from computer games to entire encyclopedias can be found on CD-ROMs.

The **Central Processing Unit**, or CPU, can be considered the "brains" of your computer. It consists of one or more circuit boards inside a computer that do most of your computer's work.

A **Chat Room** is a location on the Internet or Web that allows users anywhere to communicate almost instantaneously by typing, sending, and reading messages.

Domain Name see "URL."

To **Download** means to copy a file from one computer system to another.

E-mail (electronic mail) refers to a way of sending messages electronically from one computer to another, generally through a modem and telephone line that are connected to a computer.

Fiber Optics are little plastic or glass "threads" that use light to send digital information even more quickly than electrical wires or cables can.

A **Floppy Disk** is a small, plastic disk coated in a magnetic substance; it's used to store computer data.

Hardware is a term for the nuts, bolts, and wires of computer equipment. Central processing units, monitors, and modems are common pieces of hardware.

A **Home Page** is the starting point on a particular group or organization's World Wide Web site (which typically consists of multiple "pages").

A **Hypertext Link** is a way to connect a Web page to other pages that have related content. A link is usually underlined, and when you click on it you connect to the site without having to know or type its Web address (or URL).

HTML (Hypertext Mark-up Language) is a set of commands that tells a Web browser program how the Web page currently being viewed should look on your computer's screen.

The **Internet** is a worldwide network of computers people can use to gather and display information, and to communicate with one another. Using the World Wide Web is a popular way to explore the Internet.

Information Technology is the field of work and study that deals with processing and managing information and data using computers and related technology. It includes everything from Web design to computer programming.

Interactive Programs give you individualized results from your computer, depending on what information or action you enter into the program. Computer games and chat rooms are interactive programs.

Internet Service Provider (ISP) is a generic term for a company that connects you directly to the Internet through its server. You use an ISP to connect onto the Internet every time you log on.

The **Keyboard** refers to the part of the computer that resembles a typewriter. You use it to enter and change information.

A **Microprocessor** or **Microchip** is a small, integrated electronic circuit that can perform all the tasks of a central processing unit (CPU)—store information, do calculations, etc.

A **Modem** is a device that allows computers to transmit information to one another via an ordinary telephone line by changing digital (electronic) signals to telephone ("analog" or soundwave) signals and then back to digital signals.

A **Monitor** is the part of the computer that resembles a television screen; it's where you see your work.

A **Mouse** is a small device attached to the computer by a cord that lets you give your computer directions by moving a pointer around your computer screen.

Multimedia refers to programs that can combine text with pictures, sounds, and video. The World Wide Web is the multimedia version of the Internet.

A **Network** refers to two or more computers that are connected and can share information. Those in the same or nearby buildings are called *local area networks* or *intranets*; those that are farther away are called *wide area networks*. The Internet is a result of connecting networks all over the world.

Online Services are companies that offer members partial or full Internet/Web access. "Subscriber services" offer their members special services in addition to internet access.

Operating System see "Software."

Peripheral Devices refer to any part of a computer other than the central processing unit (CPU). Disks, keyboards, monitors, and printers are all peripheral devices..

A **Program** is a sequence of instructions that tells a computer how to perform a task or function. Also see "Software."

Search Engines are Web pages that make it easy for you to find things on the Internet by allowing you to search for information by typing in keywords or topic areas.

A **Server** is a powerful networked computer that can send and receive information to and from many different computers at once.

Software refers to a computer program or set of instructions. Operating system software operates the computer hardware itself and is invisible to you. Application software performs specific activities, such as word processing, games, Web pages, or spreadsheets.

Telecommunications is the science that deals with sending and receiving digital signals over large distances so people can communicate. Telecommunications includes everything from e-mail to digital cellular phones.

The **URL** (Uniform Resource Locator) refers to the address of a site on the Internet. It also is called a domain name.

The **World Wide Web** (Web or WWW) is a hypertext-based network of Internet sites and browsers that provide multimedia, not just text. These pages have "www" at the front of their URLs (e.g., www.parentech.org). Most Internet sites these days are Web pages.

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The way we work... Technology + Careers

The way we live... Technology + Society

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Parenting in a Digital Age

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Ameritech

North Central Regional Educational Laboratory
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NCREL
North Central Regional Educational Laboratory
"Applying Research and Technology to Learning"

Suggestions for using this program:

1. **Read the ParenTech print guides** and learn about how technology impacts how we learn, work, and live.
2. **Compare your views** to what the experts think about technology and middle school education, career development, future trends, and parenting in a digital age.
3. **Try fun activities** that will focus your ideas for helping your child live, work, and learn with technology.
4. **Interact** with multimedia that illustrates strategies for becoming more resourceful in a digital age.
5. **Learn technology** lingo and how to access Web resources that will boggle your mind!

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Recommended minimum computer configuration:

Windows 95/NT:
- 486/66 or higher
- SVGA monitor (256 colors minimum)
- 16 MB RAM
- 4X CD-ROM drive
- QuickTime for Windows (included on the CD-ROM)
- Acrobat Reader (included on the CD-ROM)

Macintosh:
- PowerPC processor
- System 7.0 or higher
- Color monitor (256 colors minimum)
- 16 MB RAM
- 4X CD-ROM drive
- QuickTime (included on the CD-ROM)
- Acrobat Reader (included on the CD-ROM)

Instructions for running this program:

Windows 95/NT:

Double-click on the "My Computer" icon
Double-click on the icon for your CD-ROM drive labeled "Digital"
Double-click on the "Digital.exe" icon
See the "Readme.txt" file for more details

Macintosh:

Double-click on the "Digital" icon on the CD-ROM
See the "Readme.text" file for more details

MADE WITH macromedia

SUPPORTS Adobe Acrobat

QuickTime™

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